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ARTICLE V.

Observations on the Naiades, and Descriptions of New Species of that and other Families. By Isaac Lea. Read before the American Philosophical Society, May 7, 1830.

SINCE I presented my last paper on the Naiades, which was published in the third volume of the Society's Transactions, I have been fortunate in obtaining many species hitherto undescribed.

I have possessed for several years many individual specimens which I supposed to be new, but which I deferred describing until I should possess of each kind individuals of different ages. My late acquisitions have converted my suppositions into certainty; and I now offer the following descriptions with a view to their publication in the fourth volume of the Society's Transactions, to be accompanied by figures executed like those attached to my last memoir.

In that memoir I took occasion to make some remarks on the "elevations on the surface of the disks." I had not at that time satisfied myself entirely in regard to the manner in which these were accomplished by the animal. Some fine specimens of the *Unio cornutus*, in all the stages of growth, having since been procured, I have been able to trace these formations through every degree.

It will be observed on examination, that the horns alternate; that is, those on one valve are not placed opposite to those on the other; consequently one is made at a time. The animal deposits the secreted carbonate of lime on the outside of the edge of one valve, where the horn is to be formed, and on the inside of the edge of the other; the

consequence of which is, that when the horn is sufficiently elevated, the line of the opening at the base of the shell has diverged from the plane of the valves into an obtuse angle at this point. The deposit of the secretion is then reversed, and the line of the opening at the base is soon restored to the plane of the valves. If another horn is to be formed, this lateral increase of the edges is carried on until the same effect is produced on the other side of the shell. The natural consequence of this alternation is a depression on the outer side of one valve corresponding to the horn on the other, and thus we ever find it. In one of my specimens the turn is so short, after the formation of the last horn, that this side passes over the other and forms a plane one third of an inch, so that the specimen presents the curious phenomenon of a shell standing erect on its base, when placed on a smooth surface.

The plicæ or folds are formed on the same principle. In the basal and posterior margins of the plicated species we may see the line of opening undulated by every fold, and when the deviation from the plane takes place in one valve it is followed up always by the other. In the *Unio tuberculatus*, when tuberculated to the edge, these tubercles cause it to be crenate.

In the *Unio metanever* we are presented with different elevations on the disks. This beautiful and interesting species is furnished with elevations, small at the beaks, and enlarging towards the base along the umbonal slope. These elevations are antagonist, and being formed at the same time, we consequently see, in a certain stage of growth, quite a knob at the angle of the basal margin. In the *Unio lacrymosus*, which is furnished with smaller elevations on the umbonal slope, we find them to alternate.

When making some observations on "colour" in my last memoir, I mentioned that "the green irregular spots and marks" on the interior of the valves were "accidental, perhaps the effect of disease." Subsequent observation led me into an examination of these marks, and the result is a perfect conviction of their being epidermal matter, evidently placed occasionally between successive layers of nacre, as it were in anticipation of a future erosion of the beaks. In a specimen of *Unio pustulosus* (herein described) in my cabinet, erosion has taken place

into the mass of its thick beaks to the distance of one third of an inch, where a *false beak* is exhibited covered with a thin layer of epidermal matter, and a fracture of this false beak displays another within, entirely covered with the same matter. In the same specimen, which is more eroded than any I have seen, a considerable portion of the cardinal tooth is visible from the exterior, and this portion is also covered with epidermal matter.

I will take the opportunity here to remark on the absolute necessity of studying the different ages of the species of this family, to enable us to decide upon new species. I have never been more thoroughly convinced of any thing than this. When I have been able to do so, I have always placed in my cabinet at least three or four specimens of different ages. Four years since, I obtained a large old specimen of the *Unio multiplicatus* (herein described), which I placed with my specimens of *Unio plicatus*. Two young specimens were received at the same time, and so totally different were they in appearance, that it did not occur to me there was any similarity between them and the old one. These were placed with the *Unio tuberculatus*, in the belief of their being a compressed variety of that species. A specimen subsequently received, which furnishes the engraving, proved at once their identity by displaying the numerous undulations in the region of the beaks.

I have continued to give my attention to the habits of the animals of this family, but I have in vain attempted to satisfy myself as to the nature of their food. Dissatisfied with the results of the observations mentioned in volume third, I procured, among other species, a fine *Unio cariosus*, the valves of which were much more gaping than usual. Selected specimens of various species were placed in a glass vase, in the bottom of which was placed clean white sand, so that their natural beds might be somewhat imitated. In this vessel they assumed their natural position by pushing the sand behind them with the protruded foot, thus forming a pit into which the base of the shell gradually fell, the ligament taking the most elevated situation. In this position they soon began to travel round the vessel, and this locomotion continued for some days, when it ceased entirely.

Their extreme timidity or apprehension on the approach of danger

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was very evident. At first the slightest agitation or movement of the vessel caused them to close their valves instantly. Being almost daily disturbed, this alarm after a time ceased, particularly with my fine *cariosus*, which now suffered even the agitation of the water without closing the valves, stretching out its fine dark and beautiful tentacula from the borders of its mantle, and forming by the contact of its edges two openings one below the other.

From the superior of these openings the constant stream ejected could be plainly perceived for two inches elevating the water at its surface. Being very anxious to ascertain through what part the water necessary to supply this stream was carried into the shell, I discovered it, after many experiments, to pass in by the inferior opening ; that it passed out by the superior one had always been evident. This operation was unremitting while the water was fresh ; when left unchanged for some days this current invariably ceased. Doubting the correctness of my former idea, as to the probability of their feeding on animalcula, from the circumstance of finding the passage of the water to exist only while fresh, and never when animalcula were visible even with a microscope of great power, I instituted some experiments by passing pieces of bread, very small pieces of worms, &c. between the tentacula. Several of them would sometimes remain for some minutes within the mantle and so far within as to be invisible, but they were in every case in a very short time thrown out with a rapid and sudden jet of water to the opposite side of the vessel.

These experiments were frequently repeated during the course of a year upon the same specimen, and the result was uniformly the same. No food introduced into the shell could be ascertained to have remained ; it may therefore be pretty safely concluded, that neither animalcula nor food in a more solid state are necessary to the nourishment of the *Naiades*. What then are we to conclude it to be ? Would the decomposition of water serve the purpose of nourishment as well as breathing ? Certain it is, that during the many years I have been in the habit of almost constantly having them alive for examination, dissection, &c. I have never in any instance given them food, unless it was conveyed invisibly to them in the pure water with which our city is supplied through our works from the river, and which was given them every few days.

When I established the genus *Sympynota**, I remarked on the difficulties attending the present generic divisions of the family *Naiades*. Since that period a closer attention to these divisions has convinced me of the entire impossibility of defining limits to them. The hinges in the species of the different genera glide or shade away so completely into each other, that I have no hesitation in saying it is entirely impossible for any naturalist to mark out a line of unvarying character to most of them. It must therefore be conceded that other characters are required for generic divisions.

If we examine the

Anodonta cygnea (Lam.), we find the margin under the beak and ligament to be an uninterrupted line. In the

Iridina nilotica (Sowerby) this line is slightly interrupted under the point of the beak. In the

Anodon areolatus (Swainson) we have this interruption more distinctly marked, the elevations being larger and more curved, evidently forming an incipient tooth which approaches very closely to the

Alasmadonta marginata (Say), and forms with it a natural link.

The next in the chain appears to be the

Alasmadonta rugosa (Barnes), which has an incipient lateral tooth; and that which follows very closely is the

Unio calceolus (Nob.), which has the lateral tooth very slightly more defined than the preceding. In the

Sympynota compressa (Nob.), we have the tooth more perfect and extended, forming a moderately well characterised lateral tooth of the genus *Unio*. The well known

Unio pictorum (*Mya pictorum*, Lin.) presents us with cardinal and lateral teeth completely formed. In this genus, the *Unio*, we have an infinite variety in the forms of teeth. In the

Sympynota alata (Nob.), the cardinal and lateral teeth are compressed in most specimens; and the next change we find, is in the

Hyria avicularis† (Lam.), in which the cardinal tooth is somewhat

* See Vol. III. p. 442.

† When the animal of this genus shall be examined, it will be found, I have no doubt, to differ from the *Unio*, *Anodonta*, &c. For notwithstanding Lamarck's description, "elles ont intérieurement les impressions musculaires latérales des Nayades," I have discovered that the

lamellar and forms nearly a line with the lateral tooth. The next "nuance" is in the

Sympynota lavigissima (Nob.), which possesses lamelliform cardinal and lateral teeth forming nearly a complete arc. Then follows the

Sympynota bialata (Nob.), the uninterrupted curved tooth of which is little more than an elevated line under the ligament and beaks. As far as one may be able to judge from a bad description and very bad drawing, the

Dipsas plicatus (Leach) may be with propriety placed at the end of this suite.

In the *U. oriens* described in this paper, we have a peculiarity in the formation of the termination of the lateral tooth, which is enlarged.

Under the impression, therefore, that the teeth in the Family *Naiades* do not form a sufficient distinctive character to compose genera, I propose to make a "division" of the family, the distinctive character of which will be *valves free* and *valves connate*; the genus *Unio* to include the first, the genus *Sympynota* to include the last. If subsequent groups be necessary, these may be composed of subgenera.

In my catalogue* of species, which I presumed should be considered as established, I gave the *undulatus* of Barnes as a synonym, considering it as a variety of the *plicatus*. Conversing with that naturalist over his cabinet some time before his death, he expressed himself as being very much of that opinion. At that period neither of us had seen a young specimen of this species; very recently I have been fortunate enough to obtain several, and the examination of the beaks of these, which are nearly perfect, convinces me, that although the *undulatus* resembles the *plicatus* in its general characters, yet, that the beaks are sufficiently dissimilar to make them specifically different.

extensor muscle of the foot is attached to the internal base of the cardinal tooth and there forms a remarkable cicatrix, which of course is over the large anterior (posterior of Lam.) cicatrix, while in all the numerous species of *Naiades* which I have examined, the cicatrix of the extensor muscle has been situated below the large anterior cicatrix. In anatomical structure they must therefore differ.

* Transactions, Vol. III.

UNIO TRAPEZOIDES. Plate III. fig. 1.

Testâ trapezio simili, inæquilaterali, trânsversâ, postice undulatâ; valvulis crassis; dentibus cardinalibus utriusque valvulae duplicebus; lateralibus laminatis curvisque; margaritâ purpureâ et iridescente.

Shell trapezoidal, inequilateral, transverse, undulated behind; valves thick; cardinal teeth double in both valves; lateral teeth curved and lamelliform; nacre purple and iridescent.

Hab. Lake St Joseph, Louisiana. J. T. Griffith, Esq.

My Cabinet.

Cabinet of Prof. Vanuxem.

Diam. 1·9,	Length 2·6,	Breadth 4·3 inches.
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Shell trapezoidal, more angular behind, transverse, undulated on posterior half; umbonal slope elevated almost into a carina, anterior to which the undulations are oblique and disposed to lie parallel to each other; posterior slope large and elevated into a carina; sides flattened; substance of the shell thick; beaks slightly prominent and incurved; ligament large, long and slightly curved; epidermis black and wrinkled; cardinal teeth double in both valves, crenate and deeply cleft in the left valve; lateral teeth, long, curved and lamelliform; anterior cicatrices distinct and rough; posterior cicatrices confluent; dorsal cicatrices situated under the posterior part of the cardinal tooth; ventral cicatrix very perceptible; cavity of the beaks wide and deep; nacre dark purple and iridescent.

Remarks.—This highly interesting species came into my possession through the kindness of J. T. Griffith, Esq. of Natchez. It approaches the *U. plicatus** of Lesueur, more nearly than any other species with which I am acquainted; it differs, however, from that species, strikingly, in the colour of the nacre, in the general outline of the shell

* For the authority of this name and author, see Am. Conch. article *Unio crassus*; also Barnes's article in Silliman's Journal, Vol. VI. p. 120.

and in its remarkable square sides. The great peculiarity of this species is in its possession of a small cicatrix (which I propose to call the *ventral cicatrix*) anterior to the central part of the cavity of the shell. In no other species have I ever met with the slightest indication of this cicatrix, although I have examined numerous larger and more globose specimens of various species with this view.

UNIO MULTIPLICATUS. Plate IV. fig. 2.

Testá trapeziali, inaequivalvi, oblique transversá, maxime undulatá; valvulis crassissimis; dentibus cardinalibus crassis, lateralibus longis curvisque; margaritá albá et iridescente.

Shell trapezoidal, inequivalve, obliquely transverse, much undulated ; valves very thick ; cardinal teeth thick ; lateral teeth long and curved ; nacre pearly white and iridescent.

Hab. { Tennessee River. Prof. Vanuxem.
 { Ohio River. T. G. Lea.

My Cabinet.

Cabinet of Prof. Vanuxem.

Diam. 2·2, Length 3·8, Breadth 5·6 inches.

Shell trapezoidal, obliquely transverse, undulated except near the anterior margin, compressed towards basal and posterior margins ; undulations diverge from the umbonal slope and in the superior part curve towards the dorsal margin which is carinate ; substance of the shell very thick ; beaks slightly prominent and rugose with undulations extending over the umbones which are flattened ; ligament large, long and curved ; epidermis black and much wrinkled ; cardinal teeth thick and sulcate ; lateral teeth large, long and slightly curved ; anterior cicatrices distinct ; posterior cicatrices confluent ; dorsal cicatrices situated on the under side of the plate between the cardinal and lateral teeth ; cavity of the beaks rather large and rounded ; nacre pearly white, iridescent and surrounded by a distinct dark margin.

Remarks.—This fine large species was one of many fine shells

brought by Prof. Vanuxem from the western states. It is very nearly allied to the *plicatus* (Lesueur) in its general characteristics, but when the beaks are not much eroded, it may be at once distinguished from that species by the numerous small irregular undulations which surround and cover the beaks, and of which the *plicatus* is entirely destitute except at the very tip of the beaks ; where the small folds are entirely unconnected with the large ones. In a very young state no two species, scarcely, can be more different, the *multiplicatus* being entirely covered with undulations, while the *plicatus* possesses none, except the small ones at the tip. In this state it resembles exceedingly the *tuberculatus* of Barnes, and when I received my first specimen, I referred it to that species, considering it a variety, and should most probably have continued to be of that opinion, had I not obtained a large specimen sufficiently perfect to display the irregular undulations in the region of the beaks. The facts mentioned above, show the absolute necessity of studying the young in making ourselves acquainted with the species.

UNIO ASPERRIMUS. Plate V. fig. 3.

Testā sebquadrangulari, inaequilaterali, postice biangulari, natibus ad baseos marginem sulcatā et nodulis instructā; valvulis percrassis; natibus elevatis; dentibus cardinalibus prāgrandibus, lateralibus magnis subrectisque; margaritā pulchrā et iridescente.

Shell sub-quadrangular, inequilateral, biangular behind, sulcated from beaks to basal margin, thick and noduled ; valves very thick ; beaks elevated ; cardinal teeth very large ; lateral teeth large and nearly straight ; nacre beautifully pearly and iridescent.

Hab. Ohio River. T. G. Lea.

My Cabinet.

Cabinet of T. G. Lea.

Cabinet of Lyceum of Natural History of New York.

Diam. 2·3, Length 3·6, Breadth 4·8 inches.

Shell sub-quadrangular, biangular behind, sulcated from beak to

basal margin, roughly noduled and thick ; basal margin emarginate ; substance of the shell thick ; beaks prominent, retuse ; nodules along the umbonal slope and before the furrow, which is smooth ; posterior slope covered with nodules ; nodules posterior to the furrow are disposed to be transverse and on the umbones erect or recurved ; ligament large ; epidermis wrinkled and fuscous in adult specimens,—in younger specimens it is yellowish brown with obsolete rays ; cardinal tooth very large, widely cleft, sulcated and crested in the left valve, in the right valve emerging from a pit ; posterior cicatrices confluent ; anterior cicatrices distinct, the great one deep ; dorsal cicatrices situated on the under part of the cardinal tooth ; cavity of the beaks angulated, large and deep ; nacre beautifully pearly white and iridescent.

Remarks.—This fine and interesting species is nearly allied to the *U. lacrymosus* (Nob.). It differs from it distinctly in the possession of nodules which are rough and disposed to be erect and transverse. The tubercles of the *lacrymosus* take a direction towards the basal margin, and are similar to tears flowing down the cheek. The posterior margin in the present species is more protruded, while the area of the anterior portion is smaller than that of the *lacrymosus*. It cannot be mistaken for the *U. metanever* (Rafinesque), which possesses large elevations along the umbonal slope. In younger specimens than the one represented here the basal and posterior margins are more rounded.

UNIO CONGARÆUS. Plate VI. fig. 4.

Testa rhomboideo-ellipticâ, transversâ, inaequilaterali ; valvulis tenuibus; natibus subundulatis; dente cardinali obliquo compressoque; dentibus lateralibus longis, et prope terminos posteriores auctis; margaritâ sericeâ et iridescente.

Shell elliptico-rhomboidal, transverse, inequilateral ; valves thin ; beaks slightly undulated ; cardinal tooth oblique, compressed ; lateral teeth long and enlarged towards the posterior end ; nacre satinlike and iridescent.

Hab. Congaree River, South Carolina.

My Cabinet.

Cabinet of Prof. Vanuxem.

Cabinet of P. H. Nicklin.

Cabinet of H. C. Carey.

Cabinet of the Academy of Natural Sciences, Philadelphia.

Diam. .7, Length .1, Breadth 1·6 inches.

Shell elliptico-rhomboidal, transverse, somewhat flattened at the sides; posterior slope furnished with slight undulations; substance of the shell thin; beaks slightly prominent, and furnished with parallel concentric undulations near the tips; ligament short; epidermis yellow, and yellowish brown; rays green and numerous; cardinal tooth oblique, compressed, and slightly cleft in the left valve—in the right single; lateral teeth long, slightly curved and enlarged towards the posterior end; anterior cicatrices distinct; posterior cicatrices confluent; dorsal cicatrices situated under the plate, between the cardinal and lateral teeth; nacre satin like, and beautifully iridescent.

Remarks.—I obtained several specimens of this shell, on the shores of the Congaree, at Columbia, S. C. It resembles the *radiatus* (Gmelin) and *complanatus** (Solan.), which species are frequently mistaken for each other, and this may readily be confounded with either of them. It has, like the *radiatus*, many rays, but differs in being more angulated on the umbonal slope, and in measuring less from the posterior dorsal margin to the basal margin. It differs from the *complanatus* in its rays, and in having slight undulations on the posterior slope. It is more diminutive in size than either, not being more in volume than one-fifth of the *complanatus* from the same locality.

UNIO ORIENS. Plate VI. fig. 5.

Testá longo-ovatá, transversá, inaequilaterali, compressá et radiis pulcherrimis pictá, valvulis tenuibus; natibus subprominulis et retusis; dentibus cardinalibus

* For reclamation of this species, see Vol. III. p. 416.

parvis et imperfectis, lateralibus imperfectis et indivisis; margaritâ cæruleo-albâ, iridescente, et in natum cavo purpureâ.

Shell long-ovate, transverse, inequilateral, compressed and beautifully rayed; valves thin; beaks scarcely prominent and retuse; cardinal teeth small and imperfect; lateral teeth imperfect and divided; nacre bluish white, iridescent and purple in the cavity of the beaks.

Hab. Ohio river, T. G. Lea.

My Cabinet.

Cabinet of R. Peter, Pittsburgh.

Cabinet of Dr Hildreth, Marietta, Ohio.

Diam. .5,	Length 1·1,	Breadth 2·8 inches.
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Shell long-ovate, transverse, compressed; substance of the shell very thin; beaks scarcely prominent, and situated towards the anterior margin; ligament linear; epidermis slightly wrinkled, yellowish, with oblique interrupted green rays, which enlarge posteriorly; cardinal teeth very imperfect; lateral teeth straight, very imperfect, (having little or no longitudinal division, even in the left valve) enlarged at posterior termination; anterior cicatrices distinct; posterior cicatrices confluent; dorsal cicatrices situated in the centre of the cavity of the beaks; cavity of the beaks wide and very shallow; nacre bluish white, iridescent, purple in the cavity of the beaks.

Remarks.—The specimen which is here described and figured, was sent to me three or four years since, and has never ceased to excite in me great interest and attention. The very imperfect state of the teeth compelled me to doubt of the propriety of erecting it into a new species, although the specimen bore no appearance of a malformation in any other part, however different it was from other species of the family I had seen. Two other specimens, one of which is young, having recently come into my possession, prove to possess precisely the same characters in every respect, and the only difficulty which now stood in the way of giving it a place in our systems was to determine its *genus*! It appears to me, for the present, most proper to place it with the *Uniones*. It cannot be placed with the *Anodontæ* of Lam. for he describes that genus as having “cardo linearis edentulus.” It would be equally difficult to class it with the *Alasmodontæ* of Say, for

that conchologist says, "hinge with a primary tooth in each valve." In the *oriens* the cardinal and lateral teeth are equally imperfect, and in this respect it resembles the *U. soleniformis* (Nob.), though much less defined. Under these circumstances, it appeared necessary to give it a place with the Uniones.

UNIO BREVIDENS. Plate VI. fig. 6.

Testá subtriangulari, inaequilaterali, transversá; valvulis crassis; dentibus cardinalibus modicis, lateralibus curvis, brevibus, crassisque; margaritá albá.

Shell subtriangular, inequilateral, transverse ; valves thick; cardinal teeth rather small ; lateral teeth curved, short, and thick ; nacre pearly white.

Hab. Ohio, William Cooper.

My Cabinet.

Cabinet of Lyceum of Natural History of New York.

Diam. .8, Length 1.2, Breadth 1.7 inches.

Shell sub-triangular, angular behind, transverse ; umbonial slope curved ; sides flattened ; substance of the shell thick ; beaks slightly prominent ; ligament short ; epidermis yellow, wrinkled ; rays small, slightly curved and interrupted ; cardinal tooth rather small, slightly elevated and widely cleft in the left valve, single and emerging from a pit in the right valve ; lateral teeth curved, short and thick, posterior and anterior cicatrices both distinct ; the smaller posterior one being placed directly over the larger and beneath the point of the lateral tooth ; dorsal cicatrices situated on the under part of the cardinal tooth ; cavity of the beaks arched, shallow ; nacre pearly white.

Remarks.—For this interesting and fine species we are indebted to the liberality of the members of the Lyceum of Natural History of New York, who, in accordance with their known zeal in the promotion of natural science, promptly passed a vote to permit their new fluvial shells (herein described) to be described for, and inserted in our Transactions, under the impression that science would be benefited by

their being embodied in one paper with those which I was about to publish. This species somewhat resembles *U. triangularis* of Barnes. It differs from it in being less ventricose, more ponderous, possessing thicker teeth and in the rays which are interrupted indistinct lines.

UNIO PUSTULOSUS. Plate VII. fig. 7.

Testa modice producta, aquilaterali, inflata, dimidio postico tuberculata; valvulis crassis; natibus prominentibus et ad apices granulatis; dentibus cardinalibus subgrandibus; lateralibus brevibus, crassis, rectisque; margarita albâ et iridescente.

Shell rather elongated, equilateral, inflated, tuberculated on posterior half; valves thick; beaks elevated and granulated at tip; cardinal teeth rather large; lateral teeth short, thick and straight; nacre pearly white and iridescent.

Hab. { Ohio, T. G. Lea.
 { Alabama river, Judge Tait.

My Cabinet.

Cabinet of Professor Vanuxem.

Cabinet of P. H. Nicklin.

Cabinet of H. C. Carey.

Cabinet of the Academy of Natural Sciences of Philadelphia.

Cabinet of Peale's Museum.

Unio verrucosus. Var. *b?* Barnes.

Diam. 1·4, Length 2·2, Breadth 2·1 inches.

Shell rather elongated, equilateral, inflated, irregularly tuberculated on posterior half, but not on the first and second growths; tubercles generally large; substance of the shell thick; beaks elevated and granulated at tip; ligament short and thick; epidermis bright brown; a single broad interrupted ray passes from the beak nearly to the centre of the disk; cardinal tooth rather large and widely cleft in the left valve—single and emerging from a pit in the right valve; lateral teeth short, thick and straight; anterior and posterior cicatrices both distinct; dorsal cicatrices situated on the under part of the cardinal

tooth; cavity of the beaks deep and angulated; nacre pearly white and iridescent.

Remarks.—This species has heretofore been considered as the *Verrucosus* of Barnes. Although the general form resembles the *Verrucosus*, it differs from it in several essential characters. It has not the beautiful recurved, and finely undulated beaks, nor has it the dark chocolate coloured nacre of the true *Verrucosus*. It has a large interrupted ray across the centre of the disk, which is absent in the other, and the tubercles are more in the form of blisters. In the *Verrucosus*, the first and second growths are furnished with tubercles; in the *Pustulosus*, they are not. Objections may be made to the use of colour of nacre as a character. It may be safely used, when on examination of many specimens, there is no appearance of fading away by tints into another colour. The *U. tor-sus* (Rafinesque) presents us always with a rich chocolate nacre. The *U. rectus* (Lam.) varies from rich purple and salmon through all the tints of these colours to perfect white, and the same may be said of the *U. cuneatus* (Barnes) and *U. complanatus* (*Mya complanata*, Solan.). The *U. circulus* (Nob.) varies from perfect white to dark pink. These variations of colours are frequent in this genus. Of the numerous specimens of *Verrucosus*, I have never seen one which was not chocolate coloured. In the *Pustulosus*, I have never seen the nacre other than white.

UNIO STAPES. Plate VII. fig. 8.

Testā triangulari, subæquilaterali, postice valde angulatā, tuberculatā; valvulis crassis; dentibus cardinalibus subgrandibus; lateralibus brevibus, a cardinalibus separatis; et versus baseos marginem vergentibus; margaritā albā.

Shell triangular, nearly equilateral, very angular behind, tuberculated; valves thick; cardinal teeth rather large; lateral teeth short, distinct from the cardinal teeth and pointing to the basal margin; nacre pearly white.

Hab. Alabama river, Judge Tait.

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Diam. ·9, Length 1·5, Breadth 1·6 inches.

Shell triangular, nearly equilateral, very angular behind, and rounded before; anterior portion furnished with triangular formed tubercles, the apices of which point to basal margin; portion immediately before umbonal slope free from tubercles; umbonal slope elevated and tuberculated from the beaks to the margin; posterior slope truncate, undulated, nearly perpendicular, flat, with the exception of a small portion of the margin behind the ligament; umbones flattened; substance of the shell thick; beaks prominent; ligament short and thick; epidermis yellow, slightly wrinkled, and furnished with indistinct, small, green pencil marks in the place of rays; cardinal tooth rather large, elevated and widely cleft in the left valve, single and emerging from a pit in the right valve; lateral teeth very short, straight and pointing to the basal margin; the cardinal and lateral teeth are separated by a flat plate; posterior and anterior cicatrices both distinct, the smaller posterior one being placed directly over the larger, and beneath the point of the lateral tooth; dorsal cicatrices situated on the under part of the cardinal tooth; cavity of the beaks deep and angulated; nacre very pearly and iridescent.

Remarks.—This very curious and interesting shell was among the many fine specimens sent me by Judge Tait, to whose kindness I am under great obligations for several of the new species here described. The present species, in outline, is an anomaly in the family Naiades. The truncature behind is almost as abrupt as that of any *Donax*. This truncature gives the shell the form of a stirrup, and causes the lateral teeth to take a direction (towards the basal margin) peculiar to this species. The triangular form of the tubercles, particularly on the superior anterior part, is so peculiar as to render it impossible to confound it with any other species.

UNIO PUSTULATUS. Plate VII. fig. 9.

Testá suborbiculari, aequilaterali, inflatá, margine posteriori emarginatá; valvulis crassis, et duabus tuberculorum seriebus instructis; dentibus cardinalibus magnis; lateralibus brevibus subrectisque; margaritá albá et iridescente.

Shell nearly circular, equilateral, inflated, posteriorly emarginate; valves thick and furnished with two rows of tubercles; cardinal teeth large; lateral teeth short and nearly straight; nacre pearly white and iridescent.

Hab. { Ohio, T. G. Lea.

{ Tennessee, Professor Vanuxem.

My Cabinet.

Cabinet of Professor Vanuxem.

Cabinet of P. H. Nicklin.

Cabinet of the Academy of Natural Sciences of Philadelphia.

Diam. 1·3, Length 1·9, Breadth 2·1 inches.

Shell nearly circular, equilateral, inflated, posteriorly emarginate, furnished with two vertical rows of tubercles on each valve, one in a direct line from the beaks to the basal margin, the other along the umbonal slope; those of the latter resemble pustules. The first tubercle appears on the third growth; the fourth and each successive growth have two parallel to each other. Posterior margin granulate; substance of the shell thick; beaks elevated, slightly recurved, and granulate at the tip; ligament short and thick; epidermis yellowish brown and rather smooth; cardinal tooth large, elevated and widely cleft in the left valve, single and emerging from a pit in the right valve; lateral teeth short and nearly straight; anterior cicatrices distinct; posterior cicatrices confluent; dorsal cicatrices situated on the under part of the cardinal tooth; cavity of the beaks deep and angulated; nacre pearly white and iridescent.

Remarks.—This species somewhat resembles the *U. verrucosus* (Barnes), Var. *b*, erected into a new species in this paper under the name of *pustulosus*. It differs in being more transverse and in being destitute of the broad single ray which passes from the beak of the latter. In the arrangement of the tubercles it is altogether different;

the *pustulatus* having a row, which resembles the *cornutus* in regularity. These elevations however in the *cornutus* alternate in the two valves, while in this species they are antagonist. In very perfect young specimens, a minute tubercle may sometimes be observed on the first growth. The elevations along the umbonial slope have more resemblance to pustules, than those of the anterior row.

UNIO LENS. Plate VIII. fig. 10.

Testá lenticulari, subventricosá, aequilaterali; valvulis subcrassis; dentibus cardinalibus magnis; lateralibus brevibus subrectisque; margaritá albá, raro roseá.

Shell lenticular, subventricose, equilateral; valves somewhat thick; cardinal teeth large; lateral teeth short and nearly straight; nacre white, rarely rose coloured.

Hab. { Ohio, T. G. Lea.
 { Tennessee, Professor Vanuxem.

My Cabinet.

Cabinet of Prof. Vanuxem.

Cabinet of P. H. Nicklin.

Cabinet of H. C. Carey.

Diam. ·6,	Length ·9,	Breadth 1·2 inches.
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Shell lenticular, somewhat ventricose, equilateral; substance of the shell rather thick; beaks slightly prominent, undulated at tip; ligament short and thick; epidermis smooth, anterior to the umbonial slope brown, posterior yellowish; cardinal teeth large and oblique, deeply cleft in the left valve; lateral teeth short and nearly straight, in the left valve the superior division is much the smallest; anterior cicatrices distinct; posterior cicatrices confluent; dorsal cicatrices situated on the under part of the cardinal tooth; cavity of the beaks angular and somewhat deep; nacre white, pearly and iridescent, sometimes rose coloured.

Remarks.—This species very closely resembles the *U. circulus*

(Nob.). It differs from it, however, in being less ventricose, in having the beaks less elevated, in being usually more transverse, and in having a paler brown colour. In the *circulus*, the line of division of the brown and yellow is more distinct. In the *lens*, the brown is sometimes replaced, over the whole surface, by yellow.

UNIO ANODONTOIDES. Plate VIII. fig. 11.

Testâ angusto-ellipticâ, transversâ, inaequilaterali, inflatâ; valvulis subcrassis; natibus prominulis; dentibus cardinalibus in valvulis ambabus duplicibus et valde erectis; dentibus lateralibus longis, a cardinalibus separatis, subcurvatis; margaritâ albâ et colore salmonis parum tinctâ.

Shell narrow-elliptical, transverse, inequilateral, inflated; valves somewhat thick; beaks slightly prominent; cardinal teeth double in both valves and very erect; lateral teeth long, slightly curved and separate from the cardinal teeth; nacre pale salmon and white.

Hab. { Mississippi river, T. W. Robeson.
Alabama river, Judge Tait.
Ohio river, T. H. Taylor.

My Cabinet.

Cabinet of the Academy of Natural Sciences of Philadelphia.

Cabinet of Professor Vanuxem.

Cabinet of Dr Hildreth, Marietta, Ohio.

Diam. 1·5, Length 1·9, Breadth 4·1 inches.

Shell narrow-elliptical, much inflated, sometimes almost cylindrical; substance of the shell somewhat thick; beaks slightly prominent, placed near the anterior margin; ligament long, narrow, and nearly straight; epidermis yellowish, very smooth, shining, posterior to the umbonal slope fuscous, rarely rayed; cardinal tooth double in both valves, compressed, elevated; lateral teeth lamellar, very long, slightly curved and separated from the cardinal teeth by the absence of a plate; anterior cicatrices distinct; posterior cicatrices confluent; dorsal cicatrices situated across the cavity of the beaks; cavity of the beaks rounded, and not deep; nacre salmon or white and iridescent.

Remarks.—This singularly formed *Unio* resembles in its exterior an *Anodonta*, having a remarkably smooth epidermis and possessing in some degree the exterior of the *A. cataracta* (Say). It is easily distinguished from any described species. In some specimens the articulation of the basal margin is so great that it might almost be taken for a malformation.

UNIO GLANS. Plate VIII. fig. 12.

Testā ovato-ellipticā, transversā, inaequilaterali, inflatā; valvulis crassis; dentibus cardinalibus subgrandibus et elevatis, lateralibus, laminatis rectisque; margaritā purpureā.

Shell ovate-elliptical, transverse, inequilateral, inflated; valves thick; cardinal teeth rather large, elevated; lateral teeth straight and lamelliform; nacre purple.

Hab. Ohio river, T. G. Lea.

My Cabinet.

Cabinet of S. W. Conrad.

Diam. ·7,	Length ·8,	Breadth 1·3 inches.
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Shell ovate-elliptical, transverse, inflated; substance of the shell rather thick; beaks somewhat prominent; ligament small; epidermis black, or dark brown, and sometimes rayed; cardinal teeth rather large and elevated, in the left valve double and obliquely and deeply cleft, in the right single, three sided, and pointed; lateral teeth straight and lamelliform; anterior cicatrices distinct; posterior cicatrices confluent; dorsal cicatrices in the centre of the cavity of the beaks; cavity of the beaks wide and subangulated; nacre purple, except along the anterior and basal margins.

Remarks.—Although this small shell has no strikingly peculiar character, it is nevertheless of a different species from any I have seen. In form, it has more resemblance to *U. zigzag* (Nob.), than to any other species, but differs altogether in the epidermis and nacre, being generally destitute of rays, and having a purple nacre.

UNIO ELEGANS. Plate IX. fig. 13.

Testá subtriangulari, subæquilaterali, per umbones complanatā; latere antico valvularum crassiori; epidermide luteo-viridi; radiis numerosis ex lineis angulatis compositis; natibus complanatis incurvisque; dentibus cardinalibus elatis grandibusque, lateralibus subrectis; margaritā albā et iridescente, raro roseā.

Shell subtriangular, nearly equilateral; flattened over the umbones; valves thick before, thinner behind; epidermis yellowish green with numerous rays formed of zigzag lines; beaks incurved and flattened; cardinal teeth large and elevated; lateral teeth nearly straight; nacre pearly white and iridescent, rarely rose coloured.

Hab. Ohio river, T. G. Lea.

My Cabinet.

Cabinet of Prof. Vanuxem.

Cabinet of H. C. Carey.

Cabinet of P. H. Nicklin.

Cabinet of the Academy of Natural Sciences of Philadelphia.

Cabinet of the American Philosophical Society.

Diam. 1,	Length 1·5,	Breadth 1·9 inches.
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Shell subtriangular, nearly equilateral, acutely angular behind; flattened over the umbones; umbonal slope carinate; posterior slope much flattened; substance of the shell thick before, thinner behind; beaks flattened, incurved, nearly touching; ligament short and thick; epidermis yellowish green, with numerous rays, formed of zigzag lines, diverging from the beaks to all parts of the margin; basal margin slightly emarginate; cardinal tooth large, elevated, and widely cleft in the left valve, and emerging from a pit in the right valve; lateral teeth nearly straight; anterior and posterior cicatrices both distinct; dorsal cicatrices situated in the centre of the cavity of the beaks; cavity of the beaks rounded; nacre pearly white, (rarely pink) and iridescent.

Remarks.—This interesting and beautiful species has been considered as a variety of the *U. donaciformis* (Nob.). I had but a single

and imperfect specimen of this shell when I described the *donaciformis*, and I presumed it to be merely a variety of that shell. Subsequently, my attention being drawn particularly to it, I procured some of all the different growths, and among them the beautiful specimen now figured, which is the only one I have seen of a pink colour. On an examination of these, I could no longer doubt of its being distinct; but some doubts have arisen in my mind whether the *donaciformis* may not be a variety of the *U. zigzag* (Nob.). The specimen described as *donaciformis* is a very fine and perfect one, and if it be a true species is the only one I have seen. Among the numerous specimens of *zigzag* which I have examined, none have had those perfect and beautifully pointed beaks of the *donaciformis*; should future specimens fully establish the *donaciformis*, its natural place will be between the *zigzag* and the present described species. These observations it is hoped will draw the attention of conchologists to this species, with the expectation of being able, by examining many specimens, to decide upon the question.

UNIO EBENUS. Plate IX. fig. 14.

Testā subellipticā, oblique recurvā, inaequilaterali, ventricosā; valvulis crassis; natibus prominentibus et subterminalibus; epidermide nigro-fuscā, sed post nates luteā; dentibus cardinalibus magnis, lateralibus magnis curvisque; margaritā albā.

Shell subelliptical, obliquely recurved, inequilateral, ventricose; valves thick; beaks elevated and nearly terminal; epidermis blackish brown, behind the beaks yellow; cardinal teeth large; lateral teeth large and curved; nacre pearly white.

Hab. Ohio river, T. G. Lea.

My Cabinet.

Cabinet of Professor Vanuxem.

Cabinet of P. H. Nicklin.

Diam. 1·1,

Length 1·5,

Breadth 1·6 inches.

Shell subelliptical, obliquely recurved, inequilateral, very ventricose;

substance of the shell very thick; beaks nearly terminal and very much elevated; ligament rather short and thick; epidermis blackish brown, behind the beaks on the *second growth* it is yellow; tip of the beaks yellowish; cardinal teeth large and oblique, being in a line nearly parallel to the lateral tooth which is thick and slightly curved; posterior and anterior cicatrices both distinct; dorsal cicatrices situated on the under side of the plate between the cardinal and lateral teeth; cavity of the beaks deep and angulated; nacre pearly white and iridescent.

Remarks.—This species, which seems to be peculiar in the yellow mark behind the beaks, resembles the *U. mytiloides* (Rafin.) and might easily be mistaken for a ventricose variety of that species where the beaks are so much eroded as to have destroyed the second growth. A young individual of second growth is represented in the plate to exhibit the curious distribution of colour. The posterior third is yellow and the remainder green, the line of separation being very distinct. Those of three growths usually have no trace of yellow on the third growth which takes a brown colour. The first growth, which may be considered the tip of the beaks, is usually yellow or yellowish green over its whole surface. The largest specimen given in the plate is not more than one fourth the size it is sometimes found. It is selected, because it is the largest I have seen with the beaks sufficiently perfect to exhibit the peculiar yellow colour of this part.

UNIO ASPER. Plate IX. fig. 15.

Testá subtriangulari, inaequilaterali, postice angulatâ, valde tuberculatâ; valvulis crassis; dentibus cardinalibus subgrandibus; lateralibus aliquantulum curvatis; margaritâ albâ.

Shell subtriangular, inequilateral, angular behind, much tuberculated; valves thick; cardinal teeth rather large; lateral teeth slightly curved; nacre pearly white.

Hab. Alabama river, Judge Tait.

VOL. IV.—W

My Cabinet.

Diam. .9, Length 1·4, Breadth 1·8 inches.

Shell subtriangular, angular behind and rounded before, covered with small rough tubercles except in a furrow which passes from the beak obliquely to the basal margin which is there arcuate; the tubercles along the posterior slope arrange themselves into a series of undulations as far as the beaks; substance of the shell thick; beaks slightly prominent; ligament short and thick; epidermis brown and wrinkled; cardinal tooth rather large, slightly elevated and widely cleft in the left valve, single and emerging from a pit in the right valve; lateral teeth small, slightly curved in a direction over the cardinal teeth; posterior and anterior cicatrices both distinct; dorsal cicatrices situated on the under part of the cardinal tooth within the cavity; cavity of the beaks deep and angulated; nacre very pearly and iridescent.

Remarks.—The *asper* is more covered with tubercles than any species I have seen, these being small and numerous. It bears some resemblance to *U. tuberculatus* (Barnes), and *U. lacrymosus* (Nobis.). It differs from the *tuberculatus* in outline, and in possessing a furrow passing from the beaks to the basal margin. It differs from the *lacrymosus* in the form of the tubercles (which in that species so much resemble flowing tears) and in the roughness and colour of the exterior.

UNIO FABALIS. Plate X. fig. 16.

Testá subellipticā, transversā, inæquilaterali, crassā; valvulis crassis; radiis capillaribus undantibusque; dentibus cardinalibus parvis; lateralibus brevibus, crassis, et in termino postico auctis; margaritā albā et iridescente.

Shell subelliptical, transverse, inequilateral, thick; valves thick; rays hair-like and undulating; cardinal teeth small; lateral teeth short, thick and enlarged towards the posterior end; nacre pearly white and iridescent.

Hab. Ohio river, T. G. Lea.

My Cabinet.

Cabinet of Professor Vanuxem.

Cabinet of P. H. Nicklin.

Cabinet of R. E. Griffith, M.D.

Cabinet of Academy of Natural Sciences.

Diam. ·3,	Length ·5,	Breadth 1 inch.
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Shell subelliptical, transverse, thick; substance of the shell thick; beaks slightly prominent; ligament short; epidermis dark, and finely wrinkled; rays green, hair-like, and undulating, particularly on the posterior half; cardinal tooth double, and deeply cleft in the left valve and single in the right; lateral teeth short, straight, thick and enlarged towards the posterior end; posterior and anterior cicatrices both distinct, the smaller posterior one being placed directly over the larger and beneath the point of the lateral tooth; dorsal cicatrices situated in the centre of the cavity of the beaks; cavity of the beaks shallow and arched; cavity of the shell small and irregularly undulated; nacre pearly white and iridescent.

Remarks.—This little species first attracted my attention about three years since, when I had seen but a single specimen. Although a very small shell, I felt satisfied it possessed the characters of an adult, and my curiosity being much excited in regard to it, I made many efforts to obtain other individuals. For several of these I am indebted to the kindness of Dr Hildreth of Marietta and to Mr Robert Peter and J. S. Craft, Esq. of Pittsburg. The *fabalis* most resembles the *parvus* of Barnes. It has nearly the same size and outline; but differs much in the thickness of the valves and in the beaks. The *fabalis* is covered with rays, the *parvus* has none.

UNIO SOLENIFORMIS. Plate X. fig. 17.

Testā angusto-ellipticā, transversā, compressā, inaequilaterali, ad finem utrumque rotundatā; valvulis tenuibus; natibus prominulis; valvula utrāque tuberculum

parvum et simplicem in loco dentis cardinalis habente; dentibus lateralibus, longis, rectis, et valde imperfectis; margaritá cæruleo-albâ et iridescente.

Shell narrow-elliptical, transverse, compressed, inequilateral, rounded at both ends; valves thin; beaks slightly prominent; cardinal tooth a simple, small tubercle in both valves; lateral teeth long, straight and very imperfect; nacre bluish white and iridescent.

Hab. Ohio, T. G. Lea.

My Cabinet.

Cabinet of Dr Hildreth, Marietta, Ohio.

Diam. 1·1, Length 1·7, Breadth 4·3 inches.

Shell narrow-elliptical, transverse, rounded at both ends, compressed from the beaks to the basal margin over the umbones, slightly arcuated on the basal margin; posterior margin much compressed, substance of the shell thin; beaks minutely undulated, slightly prominent and approaching the anterior margin; ligament long and thick; umbones and inferior parts flattened; umbonal slope rounded and elevated; epidermis very dark brown and wrinkled; cardinal tooth formed of a simple small tubercle in both valves, larger in the right valve: lateral teeth straight, and so imperfect as to be divided, even in the left valve, only near the posterior end; anterior cicatrices distinct; posterior cicatrices confluent; dorsal cicatrices situated under the plate between the cardinal and lateral teeth; cavity of the beaks wide and shallow.

Nacre bluish white and iridescent.

Remarks.—A single specimen of this extraordinary and highly interesting shell came into my possession in 1827. The outline and teeth presented such an anomaly, that I was induced when I published my other memoirs on this family to lay it aside until I could better satisfy myself in regard to it. It was a very old individual, and I feared the peculiar characters it presented might have been produced by malformation and extreme age. After two or three years of unwearied attempts, I fortunately procured from Mr T. H. Taylor of Louisville a junior and an adult specimen, both exceedingly perfect, the latter of which is here represented. This proteus family seems destined to perplex the zoologist and to lead him into an inexplicable labyrinth. The pre-

sent species forms a natural link between *Unio* and *Anodonta*, by means of this imperfect lateral tooth.

UNIO ACUTISSIMUS. Plate X. fig. 18.

Testá angusto-ellipticá, inaequilaterali, postice acute angulatá; undulis a clivo umboniali divaricantibus; natibus prominulis; valvulis tenuissimis; dentibus cardinalibus parvis, lateralibus longis rectisque; margaritá tenuissimá, colore salmonis tinctá.

Shell narrow-elliptical, inequilateral, transverse, acutely angulated behind, with undulations diverging from the umbonal slope ; beaks slightly prominent ; valves very thin ; cardinal teeth small ; lateral teeth long and straight ; nacre salmon-coloured and very thin.

Hab. Alabama river, Judge Tait.

My Cabinet.

Diam. ·4,	Length ·5,	Breadth 1·1 inches.
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Shell narrow-elliptical, transverse, acutely angulated behind, with undulations diverging from the umbonal slope ; substance of the shell very thin ; beaks slightly prominent and placed about one third the distance from anterior margin ; ligament linear ; epidermis yellow, smooth and shining ; cardinal teeth small and single in both valves ; lateral teeth long and straight ; anterior cicatrices distinct ; posterior cicatrices confluent ; dorsal cicatrices within the cavity of the beaks ; cavity of the beaks wide and shallow, nacre salmon-coloured and very thin.

Remarks.—This minute shell, among the smallest of the species, is most nearly allied in outline to *U. anodontoides*. It differs from it in having undulations, and is totally dissimilar in point of magnitude.

UNIO VARICOSUS. Plate XI. fig. 20.

Testâ subellipticâ, obliquâ, postice compressâ, varicibus transversis et concentricis instructâ; valvulis præcassis; natibus subterminalibus, prominentibus, incurvis; dentibus cardinalibus modicis; lateralibus longis, magnis et subrectis; margaritâ albâ.

Shell subelliptical, oblique, compressed behind, varicose, with transverse concentric elevations; valves very thick; beaks nearly terminal, elevated, incurved; cardinal teeth rather small; lateral teeth long, large and nearly straight; nacre-pearly white.

Hab. Ohio river, T. G. Lea.

My Cabinet.

Cabinet of Prof. Vanuxem.

Cabinet of P. H. Nicklin.

Diam. 2·1,	Length 3,	Breadth 4·2 inches.
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Shell subelliptical, oblique, compressed and rounded behind, varicose from near the beak to basal margin, with transverse concentric elevations along the lines of successive growth; substance of the shell very thick; beaks nearly terminal, elevated, incurved; ligament long and large; epidermis reddish brown; cardinal tooth rather small, direction same as lateral tooth, widely cleft in the left valve, in the right valve emerging from a pit; lateral teeth long, large and nearly straight; anterior and posterior cicatrices both distinct; dorsal cicatrices situated on the lower part of the cardinal tooth, and on the under side of the plate between the cardinal and lateral teeth; cavity of the beaks rather deep and rounded; nacre pearly white.

Remarks.—This species most resembles the *U. Æsopus* (Green). It differs from it, however, in being rounded behind, in the beaks being nearly terminal, in the varices being less elevated and more transverse; and in the absence of elevations along the umbonal slope. There being no varicose undulations on young individuals, which are generally obscurely radiated, it is difficult for the unpractised eye to recognize the species to which they belong.

UNIO CASTANEUS. Plate XI. fig. 21.

Testā subellipticā, inaequilaterali, obliquā, inflatā; valvulis crassis; dentibus cardinalibus magnis; lateralibus subrectis brevibusque; margaritā maxime fulgente et iridescente.

Shell subelliptical, inequilateral, oblique, inflated; valves thick; cardinal teeth large; lateral teeth nearly straight and short; nacre very pearly and iridescent.

Hab. Alabama river, Judge Tait.

My Cabinet.

Cabinet of Professor Vanuxem.

Cabinet of P. H. Nicklin.

Diam. ·6,	Length ·8,	Breadth 1 inch.
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Shell subelliptical, oblique; substance of the shell thick; beaks prominent and situated towards the anterior margin; ligament short; epidermis slightly wrinkled, dark brown anterior to the umbonal slope, and yellowish posterior, where there are a few obsolete rays; cardinal tooth large, slightly elevated, deeply cleft in the left valve and emerging from a pit in the right valve; lateral teeth short and nearly straight; posterior and anterior cicatrices both distinct; dorsal cicatrices situated on the under part of the cardinal tooth within the cavity; cavity of the beaks wide and shallow; nacre very pearly and iridescent.

Remarks.—This small species is allied to the *U. circulus* (Nob.) in colour and to *U. ellipsis* (Nob.) in form. It has the posterior slope yellow, which is so in the *circulus*. The specimen described and figured here is not more than one fourth of the size of an imperfect specimen which accompanied it.

UNIO MULTISTRIATUS. Plate XII. fig. 22.

Testā striatā, transversā, inaequilaterali; natibus prominulis; umbonibus rugosis; dente cardinali obliquo, laminato, in valvulā sinistrā unico, in dextrā duplici; dente laterali longo et subrecto; margaritā cæruleo-albā.

Shell striate, transverse, inequilateral; valves thin; beaks slightly prominent; umboes rugose; cardinal tooth oblique, lamelliform, single in the left valve and double in the right; lateral tooth long and nearly straight; nacre bluish white.

Hab. Brazil, Mrs Mawe.

My Cabinet.

Diam. .7,	Length 1,	Breadth 1·9 inches.
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Shell subrectangular, transverse, slightly compressed and rounded nearly alike at both ends; substance of the shell rather thin; beaks slightly prominent, surrounded by wrinkles forming acute angles with each other, extending over the umbones and some distance down the umbonal slope; ligament linear; epidermis dark brown and wrinkled; cardinal tooth oblique, lamelliform, *single* in the left valve and *double* in the right; lateral teeth long, lamelliform and nearly straight; anterior and posterior cicatrices both confluent; dorsal cicatrices in the centre of the cavity of the beaks; cavity of the beaks wide and shallow; nacre bluish white and slightly iridescent in posterior margin.

Remarks.—The specimen from which the above description was made was sent to me by Mrs Mawe of London. This species approaches in outline to some of the varieties of the *U. complanatus* (Solan.). In the flexuous rugosities of the beaks it resembles the *U. corrugatus* (Lam.) and *U. cæruleus* (Nob.). It differs however from them both in outline.

UNIO DECISUS. Plate XII. fig. 23.

Testâ inaequilaterali, obliquâ, cuneatâ, scalenâ, crassâque; valvulis percrassis; natibus elevatis, incurvatis, fere terminalibus; dentibus cardinalibus aliquantulum parvis, lateralibus crassis; margaritâ albâ.

Shell inequilateral, oblique, wedge shaped, scaleniform and thick; valves very thick; beaks elevated, incurved, nearly terminal; cardinal teeth rather small; lateral teeth thick; nacre pearly white.

Hab. Alabama river, Judge Tait.

My Cabinet.

Cabinet of Professor Vanuxem.

Cabinet of H. C. Carey.

Cabinet of P. H. Nicklin.

Cabinet of the American Philosophical Society.

Cabinet of the Academy of Natural Sciences of Philadelphia.

Cabinet of the Lyceum of Natural History of New York.

Diam. 1·4, Length 1·7, Breadth 3·2 inches.

Shell wedge-shaped, thick anteriorly and scaleniform; substance of the shell thick anteriorly and thin posteriorly; beaks nearly terminal, prominent and incurved, generally decorticated; ligament rather small; epidermis yellowish brown, sometimes possessing oblique, indistinct, brown rays; cardinal tooth short and slightly elevated, in the left valve double and deeply cleft, in the right valve emerging from a pit; lateral teeth thick and curving over the cardinal teeth; posterior and anterior cicatrices both distinct; the smaller posterior cicatrix situated against the lateral tooth at its termination; dorsal cicatrices situated on the under part of the cardinal tooth; cavity of the beaks not deep, rounded; nacre thick and pearly anteriorly, thin and iridescent posteriorly.

Remarks.—This species resembles the *scalenia* of Rafinesque, but more closely approaches the *patulus* (Nob.) and *truncatus** (Swainson). It differs from the *patulus* in the rays being uninterrupted, and in being much thicker. From the *truncatus* it differs greatly in the cardinal tooth and in being wedge shaped and not cylindrical.

* I will take advantage of this opportunity to correct an error, in stating in a former paper that Lamarck and other European conchologists erroneously made the genus *Unio* feminine. I should then have mentioned that Mr Swainson was an exception.

UNIO CUPRINUS. Plate XII. fig. 24.

Testâ ovatâ, transversâ, inæquilaterali, inflatâ, postico latere latissimo; valvulis tenuibus; natibus parvis undulatisque; dentibus cardinalibus exiguis, lateralibus laminatis; ligamento longo; margaritâ cupreâ.

Shell reversely ovate, transverse, inequilateral, inflated; valves thin; beaks small and undulated; cardinal teeth small; lateral teeth thin and lamellar; ligament long; nacre copper colour.

Hab. Mexico, J. R. Poinsett, Esq.

My Cabinet.

Cabinet of the American Philosophical Society.

Diam. ·9, Length 1·1, Breadth 2·1 inches.

Shell reversely ovate, transverse, inflated, disposed to be straight in the basal margin; substance of the shell thin; beaks small, pointed, furnished with concentric undulations and placed near the anterior margin; ligament long, lanceolate; umbonal slope large and rounded; posterior slope elevated into a carina; epidermis reddish brown and wrinkled; rays obsolete; cardinal teeth very small and tuberculated; lateral teeth slender, lamellar and nearly straight; anterior and posterior cicatrices both confluent; dorsal cicatrices in the centre of the cavity of the beaks; cavity of the beaks wide; nacre copper colour and very brilliant towards the posterior margin.

Remarks.—This remarkable shell is one of the many fine specimens of the splendid collection of interesting subjects brought by our fellow member J. R. Poinsett, Esq. from Mexico, and which, by his munificence, now constitutes a valuable part of the collection of this society. In comparing this species with the others of the genus, we shall find it most to resemble the *complanatus* (Solan.). It differs however in having the posterior dorsal margin more elevated, in the peculiar copper colour of the nacre, and in the concentric undulations of the beaks. In the specimens which I have had an opportunity of examining, the anterior cicatrices were found to be confluent, a circumstance rarely met with in the Uniones.

UNIO CÆRULEUS. Plate XIII. fig. 25.

Testá angusto-ellipticá, transversá, inaequilaterali, subcylindraceá; valvulis tenuibus; natibus prominulis, rotundatis et undulatis; dentibus cardinalibus lamelliformibus, et in dextrá valvulá solá duplicibus; lateralibus rectis; margaritá cæruleo-albâ et iridescente.

Shell narrow-elliptical, transverse, inequilateral, subcylindrical; valves thin; beaks rather elevated, rounded and undulated; cardinal teeth lamelliform and double in the right valve only; lateral teeth straight; nacre bluish white, pearly and iridescent.

Hab. River Hoogly, Hindostan, G. W. Blakie.

My Cabinet.

Cabinet of G. W. Blakie.

Cabinet of Professor Vanuxem.

Cabinet of P. H. Nicklin.

Cabinet of H. C. Carey.

Cabinet of the Academy of Natural Sciences of Philadelphia.

Cabinet of Dr Burrough.

Diam. ·6,	Length ·8,	Breadth 1·6 inches.
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Shell narrow-elliptical, transverse, subcylindrical, disposed to be straight on the sides and basal margin; substance of the shell thin; beaks near the anterior margin rounded, somewhat elevated, and corrugated with diverging undulations; ligament rather short and straight; epidermis finely wrinkled and bluish green, particularly on the posterior part; rays very indistinct; posterior slope furnished with small undulations and two irregular rays on each side; cardinal teeth lamelliform and double in the right valve only; lateral teeth straight and lamelliform; anterior cicatrices distinct; posterior cicatrices confluent; dorsal cicatrices within the cavity of the beaks; cavity of the beaks wide and rounded; nacre bluish white, very pearly and iridescent.

Remarks.—This species was brought from Calcutta by Mr Blakie, to whose kindness I am indebted for it and many other fine shells.

As far as I have been able to ascertain, it has not been described. From the roughness of the beaks it might perhaps be thought to be only a variety of *corrugata* (Lam.). On comparing the two species, however, they will be found to be entirely distinct; the *corrugata* being "ovato-rhombeâ," while the *cæruleus* is "angusto-ellipticâ." In some specimens the nacre is slightly rose-coloured along the basal margin.

UNIO OBESUS. Plate XIII. fig. 26.

Testâ rhomboïdes-ovatâ, obliquâ, inaequilaterali, inflatâ; valvulis subcrassis; natibus prominulis; dentibus cardinalibus elevatis, compressis cristatisque; lateralibus longis et curvatis; margaritâ livido-albâ.

Shell ovate-rhomoidal, oblique, inequilateral, inflated; valves somewhat thick; beaks rather prominent; cardinal teeth elevated, compressed and crested; lateral teeth long and curved; nacre livid white.

Hab. York river, Vir., William Cooper.

My Cabinet.

Cabinet of Lyceum of Natural History of New York.

Diam. 1·5,	Length 2,	Breadth 3·3 inches.
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Shell ovate-rhomoidal, oblique, inflated, angular behind; substance of the shell somewhat thick; beaks rather prominent and placed near the anterior margin; posterior slope wide and furnished with two impressed lines on each side; ligament long and large; epidermis fuscous and much wrinkled; rays obsolete; cardinal teeth oblique, elevated, lamellar, crested, deeply cleft in the left valve; lateral teeth long, curved and enlarged towards the posterior termination; anterior cicatrices distinct; posterior cicatrices disposed to be distinct; dorsal cicatrices form a row across the cavity of the beaks; cavity of the beaks rounded and deep; nacre livid white and iridescent on the posterior margin.

Remarks.—This is one of the specimens so disinterestedly contributed to our Transactions by the Lyceum of Natural History of New

York. Its natural situation seems to be between the *cariosus* (Say), and *complanatus* (Solan.). It has the capaciousness of the former, and somewhat of the outline of the latter.

UNTO INCURVUS. Plate XIII. fig. 27.

Testá ovato-rhombeá, transversá, inaequilaterali; valvulis antice crassis, postice tenuibus; natibus rugosis, prominentibus incurvisque; dentibus cardinalibus elevatis cristatisque, lateralibus longis et subcurvis; margaritá albá et iridescente.

Shell ovate-rhomoidal, transverse, inequilateral ; valves thick anteriorly and thin posteriorly ; beaks rugose, prominent and incurved ; cardinal teeth elevated and crested ; lateral teeth long and slightly curved ; nacre pearly white and iridescent.

Hab. ***. From Gibraltar, Mrs Mawe.
My Cabinet.

Diam. 1, Length 1·4, Breadth 2.1 inches.

Shell ovate-rhomoidal, transverse, slightly inflated ; substance of the shell thick and white anteriorly, thin and iridescent posteriorly ; beaks prominent, large, incurved and rugose, with small concentric undulations : ligament rather short and thick ; epidermis yellowish brown ; rays oblique and green ; cardinal tooth elevated, crested and divided in the left valve, in the right simple and recurved ; lateral tooth long, slightly curved and enlarged at posterior termination ; anterior cicatrices distinct ; posterior cicatrices confluent ; dorsal cicatrices situated on the under part of the cardinal tooth ; cavity of the beaks wide and angulated ; nacre white on the anterior, and iridescent on the posterior portion.

Remarks.—This shell, although it possesses no very striking character, cannot be placed with any American or exotic described species with which I am acquainted. It was sent to me by Mrs Mawe with the locality "from Gibraltar" on the label, and I have little doubt but that it came from some neighbouring African river. It certainly does not belong to any described European species. It bears more resem-

blance to the *corrugata*, Var. *a* (Lam.), than to any other species I have seen. It differs, however, in being more transverse, in the beaks being more prominent, and in their rugosities being composed of concentric undulations.

SYMPHYNOTA BILINEATA. Plate XI. fig. 19.

Testā subellipticā, transversā, inaequilaterali, compressā; valvulis tenuissimis; posteriori margine dorsali elevatā connatāque; natibus sub prominulis, undulas concentricas et duas lineas elevatas ad marginem posteriorem currentes, habentibus; dentibus cardinalibus laminatis et in valvula dextrā solum duplicibus; lateralibus rectis; margaritā colore salmonis subtinctā.

Shell subelliptical, transverse, inequilateral, compressed; valves very thin, posterior dorsal margin elevated and connate; beaks very slightly elevated, concentrically undulate and possessing two elevated lines which pass to the posterior margin; cardinal teeth lamelliform and double in the right valve only; lateral teeth straight; nacre slightly salmon coloured.

Hab. River Hoogly, Hindostan, G. W. Blakie.

My Cabinet.

Cabinet of G. W. Blakie.

Cabinet of Dr Burrough.

Cabinet of the Academy of Natural Sciences.

Diam. ·3,	Length ·7,	Breadth 1·3 inches.
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Shell subelliptical, transverse, inequilateral, compressed, diaphanous; substance of the shell extremely thin; beaks very slightly elevated, concentrically undulate, possessing two small elevated lines which pass (posterior to the umbonal slope) to the posterior margin; valves elevated into a carina and connate in the posterior dorsal margin; dorsal margin a right line; ligament very small; epidermis shining, greenish yellow, darker on the posterior slope; cardinal teeth lamelliform and double in the *right* valve only; lateral teeth lamelliform, long and straight; posterior and anterior cicatrices both confluent; dorsal cicatrices obsolete; cavity of the beaks shallow, very wide, and

exhibiting the undulations of the beaks; nacre very thin and slightly salmon coloured, darker in the cavity of the beaks.

Remarks.—This very small species was brought from Calcutta by Mr Blakie, with the *U. cœruleus* (Nob.). Both were procured about one hundred miles above that city. It resembles, in its outward characters, the young of *S. cygnea* (*Anod. cygnea*, authors). It is, however, more transverse, and differs altogether in the formation of the hinge, which is furnished with perfect cardinal and lateral teeth. In the peculiar character of the *double tooth* in the *right* valve, it resembles the *S. ochracea*.* The *bilineata* is easily distinguished by the two delicate lines which pass from the beaks to the posterior margin.

SYMPHYNOTA INFLATA. Plate XIV. fig. 28.

Testâ ovato-triangulari, inaequilaterali, ventricosâ; valvulis pertenuibus, connatobialatis; dente cardinali in valvula singulâ unico; dentibus lateralibus ad terminos laminatis; natibus prominulis; ligamento celato; margaritâ purpureâ.

Shell triangular-ovate, inequilateral, ventricose; valves very thin, elevated into two wings, both of which are connate; cardinal tooth single in both valves; lateral teeth bladed towards their termination; beaks slightly prominent; ligament concealed; nacre purple.

Hab. Alabama river, Judge Tait.

My Cabinet.

Cabinet of Professor Vanuxem.

Cabinet of P. H. Nicklin.

Cabinet of the Academy of Natural Sciences.

Diam. 1·6, Length from the beaks to the base, 2·4, Breadth 4·5 inches.
Length from the top of the wing to the base, 3·7 inches.

Shell triangular-ovate, ventricose, transversely and finely wrinkled; substance of the shell thin; valves elevated into a broad high wing posterior, and a small one anterior to the beaks, and connate in both; pos-

* See vol. iii. p. 455.

terior wing recurved at top; beaks slightly prominent; ligament concealed in the wing; epidermis brown, with obsolete rays; two or three fuscous lines pass from the beak to the posterior margin above the umbonal slope; cardinal tooth single in both valves, and lamelliform; lateral teeth bladed and elevated towards their termination; the two teeth form one continuous curve line (with the exception of a slight angle where they join) which is abrupt at both ends; anterior cicatrices distinct; posterior cicatrices confluent; dorsal cicatrices pass from the cavity towards the anterior cicatrices, and are very perceptible; cavity of the beaks wide and shallow; nacre purple and iridescent.

Remarks.—I am indebted, for this fine shell, to Judge Tait of Alabama, who kindly sent it to me with several other new species of fluviatile and terrestrial shells described in this paper. This species seems to form a natural link between *S. lœvissima* (Nob.) and *S. bialata* (Nob.). It resembles the former in colour and in the teeth, but differs in the elevation of the wing, and in being less shining and more ventricose. It resembles the latter in its elevated wing and general outline, but differs from it in nacre, exterior colour, in not being possessed of undulations along the base of the posterior wing, and in the teeth.

MELANIA SUBULARIS. Plate XV. fig. 30.

Testa elevata, turrita, corneâ; apice acuto; anfractibus instar duodenis, planis; anfractu infimo in medio carinato; aperturâ albâ, quadrante longitudinis testæ.

Shell elevated and acutely turrited, horn colour; apex acute; whorls about twelve, flat, carinate on the middle of the body whirl; base angulated; aperture white and one-fourth the length of the shell.

Hab. Niagara river.

My Cabinet.

Diam. .4,

Length 1·3 inches.

Remarks.—I took this species at the Falls of Niagara, and being un-

able to refer it to any described species, have given it a place here. It resembles the *virginica* (Say), but differs greatly in elevation, the *virginica* having about seven whirls only. The carina causes the whirls to be flatter in the subularis. In some specimens the columella is purple.

MELANIA TUBERCULATA. Plate XV. fig. 31, a, b.

Testā obtuse turritā, latā, tenebroso-fuscā aut nigrante; apice obtuso; anfractibus quinque; medio anfractūs ultimi tuberculis instructo; labro enormiter curvo; basi angulatā; aperturā purpureā, dimidium longitudinis testæ habente.

Shell obtusely turrited, wide, very dark brown or black ; apex obtuse ; whorls five ; middle of the last whirl furnished with tubercles ; outer lip irregularly curved ; base angulated ; aperture purple and one half the length of the shell.

Hab. Tennessee river, Professor Vanuxem.

My Cabinet.

Cabinet of Professor Vanuxem.

Cabinet of P. H. Nicklin.

Cabinet of Academy of Natural Sciences,

Diam. .5, Length .9, of an inch.

Remarks.—This species is somewhat allied to the *M. armigera* (Say), but is smaller and much less ponderous. The tubercles are more numerous and less elevated. In the *tuberculata* the impressed band, which exists in the *armigera* above the armature, is wanting. In colour it differs altogether.

MELANIA ACUTA. Plate XV. fig. 32.

Testā acute turritā, tenui, corneā; apice acuto; anfractibus octo, supra suturam carinatis, in longum undatis, transversim lineatis; basi angulatā; aperturā albā, quadrantem longitudinis testæ habente.

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Shell acutely turrited, thin, horn-coloured ; apex acute ; whirls eight, carinate immediately above the suture, longitudinally undulated and transversely lineated ; base angulated ; aperture white, and one-fourth the length of the shell.

Hab. Tennessee river, Professor Vanuxem.

My Cabinet.

Cabinet of Prof. Vanuxem.

Diam. five-twentieths, Length thirteen-twentieths of an inch.

Remarks.—I have seen no described species to which this bears a close resemblance. Its delicate form, furnished with undulations and transverse lines, will easily distinguish it.

HELIX CAROLINIENSIS. Plate XV. fig. 33, a, b, c.

Testa supra depressa, infra inflata, oblique striata, fusca, imperforata; anfractibus quinque; spirae maxime obtusa; apertura coarctata; labro albo, reflexo, latoque, duobus dentibus instructo, quorum inferior longus et laminatus, superior parvus et conicus est; columella dentem levatum incurvumque habente; columellæ basi valde impressa.

Shell depressed above, inflated below, obliquely striated, fuscous, imperforate ; whorls five ; spire very obtuse ; aperture contracted ; outer lip white, broad and reflected, furnished with two teeth, the inferior one long and lamellar, the superior one small and conical ; columella with an elevated incurved tooth ; base of the columella much impressed.

Hab. South Carolina near Cheraw.

My Cabinet.

Cabinet of Professor Vanuxem.

Cabinet of the Academy of Natural Sciences of Philadelphia.

Diam. fourteen-twentieths, Length seven-twentieths of an inch.

Remarks.—I found a few specimens of this fine *Helix* while travelling through South Carolina three years since. They were taken from beneath the bark of an old tree. It is closely allied to Mr Say's *pal-*

liata, but differs in the region of the base of the columella being more deeply impressed. The oblique striae are more distinct, and no specimen which I obtained is in the least hirsute.

CAROCOLLA HELICOIDES. Plate XV. fig. 34, a, b, c.

Testâ orbiculatâ, fuscâ, supra plano convexâ, subtus inflatâ, imperforatâ, oblique striatâ; anfractibus quinque; spirâ obtusissimâ; aperturâ contractâ; labro albo, lato et reflexo, dentibus duobus instructo, quorum inferior longus et laminatus, superior parvus et conicus est; columellâ dentem unicum, longum, elevatum et incurvum habente.

Shell orbicular, fuscous, plano-convex above, inflated below, imperforate, obliquely striated; whorls five; spire very obtuse; aperture contracted; outer lip white, broad, and reflected, furnished with two teeth, the inferior one long and lamellar, the superior one small and conical; columella with a long, elevated, incurved tooth.

Hab. Tennessee, near Nashville, Professor Vanuxem.

My Cabinet.

Cabinet of Professor Vanuxem.

Helix palliata? Say, Var. *a*, Academy of Natural Sciences, Vol. II, p. 152.

Diam. eighteen-twentieths, Length nine-twentieths of an inch.

Remarks.—Among the fine shells brought by Professor Vanuxem some years since from a tour through the Western states were two specimens of this beautiful Carocolla. In its specific characters it resembles the *Helix palliata* of Say, and *Helix carolinensis* described in this paper. It is destitute of the hirsute appearance of the *palliata*, and is entirely distinct in the flatness of the whorls of the spire. In the *carolinensis* the base of the columella is more impressed and the whorls more inflated.

CAROCOLLA SPINOSA. Plate XV. fig. 35, a, b, c.

Testa lenticulari, tenui, pellucidâ, imperforata; carinâ acutâ et spinis minutis minuitâ; anfractibus sex; spira fere plana; apertura angustissima; columella dentem unicum longum et laminatum habente; labro enormiter crasso et prope finem superiorem angulato.

Shell lenticular, thin, diaphanous, imperforate ; carina acute and armed with minute spines ; whorls six ; spire nearly planular ; aperture linear, being guarded by a long tooth on the columella ; outer lip irregularly thick, angulated near the superior termination.

Hab. Alabama near Clairborne, Judge Tait.

My Cabinet.

Cabinet of the Academy of Natural Sciences.

Diam. eleven-twentieths, Length four-twentieths of an inch.

Remarks.—For this beautiful and highly interesting species I am indebted to the kindness of Judge Tait. Its peculiar delicate spines distinguished it from all described species. These, however, when the specimens are not perfect, are entirely obliterated. In the construction of the aperture it is unlike every *Carocolla* I have seen, bearing much resemblance in this region to the *Helix hirsuta* (Say).

VALVATA ARENIFERA. Plate XV. fig. 36, a, b.

Testa orbiculatâ, convexâ; anfractibus tribus, qui arenis agglutinatis operiuntur; umbilico lato; spirâ obtusâ.

Shell orbicular, convex ; whorls three, covered by the agglutinations of sand ; umbilicus wide ; spire obtuse.

Hab. Cumberland river near Nashville, W. Cooper.

My Cabinet.

Cabinet of W. Cooper.

Cabinet of the Lyceum of Natural History of New York.

Cabinet of the Academy of Natural Sciences of Philadelphia.

Diam. five-twentieths,

Length four-twentieths of an inch.

Remarks.—This very curious and interesting species was among the fresh water shells so disinterestedly sent to me by the Lyceum of Natural History of New York to be examined and inserted in this paper. It has the singular property of strengthening its whirls by the agglutination of particles of sand, &c. by which it is entirely covered, and in this character it resembles the *Trochus agglutinans*, Lam. (*Trochus conchyliophorus*, Authors.) The apex in all the specimens which I have had an opportunity of examining is broken. The operculum was observed in two specimens sufficiently perfect to exhibit a striated horny structure.

SUPPLEMENT.

Read before the American Philosophical Society, May 20th, 1831.

SINCE my Memoir, read before the Society last May, went to press, I have procured several species which I believe to be undescribed; and which I now propose to add as a supplement, with some preliminary observations.

Having had an opportunity to examine many fine specimens within a few months, particularly those brought to this city by James Ronaldson, Esq. to whose kindness I am indebted for some very rare species, I have had an opportunity of observing some colouring of the nacre which is exceedingly beautiful and rare. It is a singular fact, that several species, which may be considered, emphatically, as white in the nacre, vary slightly by being possessed, very rarely, of a tint of pink in the lateral and sometimes in the cardinal tooth or in the centre of

the valve. In the cabinets of W. Cooper, Esq. and Mr R., as well as my own, are specimens of *U. cylindricus* whose pearly teeth are beautifully tinged with the most delicate and beautiful pink. The same cabinets possess also the *U. securis* with the lateral tooth tinted in the same manner. The *U. metanever* has sometimes, though very rarely, a tint of pink, and still more rarely of nankeen yellow in the centre of the beaks. The *U. circulus*, as observed in a previous memoir, is sometimes, though rarely, possessed of a pink tint.

Whether all the species with white nacre may sometimes be possessed of this beautiful variety remains to be observed. These rare and beautiful variations will undoubtedly, when our cabinets shall be possessed of all the rare species, constitute the jewels of our collections and be exceedingly sought after.

The size to which some of the species of the *Naiades* grow is exceedingly great. I have in my cabinet the following species, of the weight and size annexed:

	Inches.	Inches.	lb. oz.
<i>U. plicatus</i> ,	length 4·6,	breadth 6·8,	weight 1 10.
<i>U. multiplicatus</i>	4·9,	6·2,	1 7.
<i>Sympynota alata</i> *	4·2,	7·1,	0 11.
<i>Sympynota complanata</i> †	5·1,	7·2,	0 15.

Nearly all the specimens which I have seen of the *U. soleniformis* (nobis) were sent from Louisville. It struck me as somewhat singular, that a species so fragile should exist about the falls of a large river, the force of whose waters there is well known. In explanation of this, I have been informed by Mr T. W. Taylor of that city, that they are found to congregate under large flat stones. Unacquainted with this fact he searched in vain for a long time without finding a single alive specimen, while odd valves were not uncommon. They were first discovered in this situation by raising a stone to take a common crawfish, which had taken refuge there. This character seems to be peculiar to this species.

My sister, Mrs Febiger of Cincinnati, mentioned to me a pe-

* *Unio alatus*, Say.

† *Alasmadonta complanata*, Barnes.

culiarity in the habits of the *Unio oriens*. This shell is possessed of so small a portion of nacre, that in some specimens the epidermis may be said to be as thick as the nacre itself. It is obvious therefore that the rolling of stones and sand carried by the rapidity of the current of the Ohio upon them, would destroy them if they took the same position with other species embedded merely in the surface of the sand. This they avoid, and, burying themselves from six to twelve inches in the sand, can only be discovered by a small round hole at the surface through which they receive their supply of water.

In the description of *U. varicosus**[†], I ought to have mentioned that I did not hesitate to make use of that name, although already used by Lamarck, having no doubt but that his species was the *Alasmodontula undulata*† (Say).

When making some observations on the family *Naiades*, Vol. III. p. 442, I mentioned in a note upon the genus *Castalia*, that it must be considered as a species of the genus *Unio*. Having recently procured from Paris a perfect specimen of it, I have given it a close examination, and do not now feel by any means certain that it ought not, *in the present received division of the family*, to be considered a distinct genus. The crenulations of the cardinal and lateral teeth in this specimen are very distinct, which was not the case in the single valve which I formerly examined. In this character it has a slight approach to the family *Arcacea*; and Lamarck very justly says, “comme elle semble fluviatile‡, elle indique que les trigonées forment une transition des arcacées aux nayades.”

Lamarck, in his description of the *Castalia*, makes no mention of the position or existence of the muscular impressions of this genus. In examining this character, I have discovered that the same observations made at page 67, in relation to the cicatrix of the extensor muscles of the *Hyria avicularis*, will equally well apply to the genus *Castalia*, and it is very remarkable that it should be so differently situated from the same cicatrix in the genus *Unio*.

* See Vol. IV. p. 90.

† See Vol. III. page 424.

‡ There cannot be a doubt of its being fluviatile.

In ascribing the locality of York river, Virginia, to the *U. obesus*, I have reason to believe there is an error. It was so labelled in the collection of the Lyceum of Natural History of New York; but this, Major Le Conte assures me, must have been done by some transfer or accidental change of the labels; as he procured them in Georgia, from whence he recently obtained a new supply of undoubtedly the same species, and those marked as from York river cannot be traced to that locality. The locality was a matter of surprize to me when I received them as coming from that river.

UNIO OLIVARIUS. Plate XVI. fig. 38.

Testâ ovatâ, transversâ, inflatâ, pellucidâ; valvulis pertenuibus; natibus prominulis; epidermide pertenui, lævi et olive colorem habente; dentibus cardinalibus magnis laminatis erectisque, lateralibus laminatis brevibusque; margaritâ pertenui albâque.

Shell ovate, transverse, inflated, pellucid; valves very thin; beaks slightly elevated; epidermis olive, very thin and smooth. Cardinal teeth large, erect and lamelliform; lateral teeth short and lamelliform; nacre very thin, white and pearly.

Hab. Burrill river, India, Dr Burrough.

My Cabinet.

Cabinet of Dr Burrough.

Cabinet of the Academy of Natural Sciences.

Cabinet of Dr Morton.

Diam. ·7,	Length ·8,	Breadth 1·5 inches.
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Shell ovate, transverse, inequilateral, inflated, pellucid: substance of the shell very thin; beaks slightly elevated, rounded and devoid of undulations: ligament very small: epidermis olive, very thin and smooth: rays obscure, cardinal teeth large, erect and lamelliform; lateral teeth short and lamelliform: anterior cicatrices slightly confluent: posterior cicatrices confluent: dorsal cicatrices not perceptible; cavity of the beaks wide; nacre very thin and bluish white.

Remarks.—This interesting little shell is from the fine collection made by Dr Burrough during his travels in India, and I am indebted to his kindness for the specimen figured. It is a perfectly distinct species, and may easily be recognised by its form, its pellucidness, and its smooth olive-coloured epidermis. It somewhat resembles a young *Anodonta* on the exterior, but the elevated lamelliform teeth easily distinguish it from that genus. Its resemblance to a Spanish olive is very striking.

UNIO PYRAMIDATUS. Plate XVI. fig. 39.

Testa sub-pyramidalis, longitudinali, inflata; valvulis antice crassioribus; natis maxime prominentibus, recurvis; dentibus cardinalibus magnis crenatisque; lateralibus longis, a cardinalibus separatis, ad baseos marginem vergentibusque: margarita colorem carnis habente.

Shell sub-pyramidal, longitudinal, inflated ; valves thick anteriorly, thinner posteriorly ; beaks very much elevated, recurved ; cardinal teeth large and crenate ; lateral teeth long, distinct from the cardinal teeth and pointing towards basal margin ; nacre flesh colour.

Hab. Ohio, T. G. Lea.

My Cabinet.

Cabinet of the Academy of Natural Sciences of Philadelphia.

Cabinet of P. H. Nicklin.

Unio undatus? Barnes, Var. *a.*

Diam. 1·7,	Length 2·3,	Breadth 2·4 inches.
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Shell sub-pyramidal, longitudinal, inequilateral, anterior part swollen recurvately from the beaks to the basal margin, compressed at posterior margin, slightly depressed anterior to umbonal slope ; substance of the shell very thick in the region of the teeth and beaks, thin at posterior margin ; beaks very much elevated, recurved and incurved ; epidermis very dark brown and finely wrinkled ; cardinal teeth large, crenate and deeply impressed in the left valve, single and emerging from a pit in the right ; lateral teeth long, slightly curved, distinct

from the cardinal teeth and pointing towards the basal margin; anterior cicatrices distinct, the great one forming a deep pit; posterior cicatrices distinct, the smaller one being placed at the end of the lateral tooth; dorsal cicatrices situated on the under part of the cardinal tooth; cavity of the beaks deep and angulated; nacre beautifully flesh coloured, very rarely white.

Remarks.—This very beautiful and interesting shell has heretofore been considered as the *U. mytiloides* (Rafin.). It does not however answer either to the description or figure of that author. It may be easily distinguished from any described species of this genus by its exceedingly elevated beaks, and beautiful nacre. In young individuals indistinct rays may be observed on the beaks.

UNIO TRIGONUS. Plate XVI. fig. 40.

Testa subtriangulari, inflata, præclivo umboniali (quod carinatum est), depressa; valvulis crassis, natibus prominentibus, incurvis; dentibus cardinalibus magnis, lateralibus magnis et subcurvis; margaritá albá et iridescente.

Shell subtriangular, inflated, depressed before the umbonal slope which is carinate; valves thick; beaks prominent, incurved; cardinal teeth large; lateral teeth large and slightly curved; nacre pearly white and iridescent.

Hab. { Ohio river at Cincinnati, T. G. Lea.
 { Ohio river at Louisville, T. H. Taylor.
 My Cabinet.

Cabinet of Professor Vanuxem.

Cabinet of J. Ronaldson.

Cabinet of the Academy of Natural Sciences.

Diam. 1·5, Length 2, Breadth 2·3 inches.

Shell subtriangular, inflated, nearly equilateral, depressed before the umbonal slope, angular behind; umbonal slope carinate; basal margin emarginate; substance of the shell thick, beaks prominent, in-

curved, and slightly undulated at the tips; ligament short and thick; epidermis brown; rays obsolete; cardinal tooth large, elevated and widely cleft in the left valve and emerging from a pit in the right valve; lateral teeth thick and curved in a direction over the cardinal tooth; anterior and posterior cicatrices both distinct; dorsal cicatrices situated on the under part of the cardinal tooth; cavity of the beaks deep and angular; nacre pearly white and iridescent.

Remarks. This is rather a rare shell, and being of a group of the species which are known under the general name of *Mytiloides* (Rafin.), it has been considered merely a variety of that species. Having recently examined this group with very close attention and with the advantage of very many specimens, I am induced to believe that it may with great propriety be divided into four species, viz. *mytiloides* (Rafin.), *undatus* (Barnes), *pyramidatus* (Nobis), and *trigonus*.

UNIO FORMOSUS. Plate XVI. fig. 41.

Testa triangulari, ventricosâ, transversâ; clivo posteriori subplano; radiis irregularibus, interruptis, subacutis; dentibus cardinalibus magnis, lateralibus brevibus subrectisque; margaritâ albâ.

Shell triangular, ventricose, transverse, nearly flat on the posterior slope; rays irregular, interrupted, and somewhat pointed; cardinal teeth large; lateral teeth short and nearly straight; nacre pearly white.

Hab. Ohio river, T. G. Lea.

My Cabinet.

Cabinet of Professor Vanuxem.

Cabinet of P. H. Nicklin.

Cabinet of the American Philosophical Society.

Cabinet of the Academy of Natural Sciences.

Cabinet of Peale's Museum.

Diam. 1,

Length 1·1,

Breadth 1·6 inches.

Shell triangular, ventricose, transverse, inequilateral; posterior slope wide, nearly forming a plane, and possessing numerous indistinct ribs; substance of the shell somewhat thick; beaks somewhat prominent and flattened; ligament short; epidermis yellowish, smooth and shining; rays numerous, irregular, interrupted and pointed somewhat like an arrow head, on the posterior slope they are very minute; umbonal slope carinate; cardinal teeth large and double in both valves; lateral teeth short, nearly straight and enlarged at posterior end; anterior cicatrices distinct; posterior cicatrices confluent; dorsal cicatrices situated on the under part of the cardinal tooth; cavity of the beaks deep and rounded; nacre pearly white.

Remarks.—This beautiful shell has heretofore been considered as a variety of *U. triangularis* (Barnes). It has, however, I think, characters sufficiently distinctive to entitle it to rank among the species. It differs from that species essentially in being less flat on the posterior slope, in the umbonal slope being carinate and not rounded, in being less transverse and in possessing a sharper edge along the basal margin. In the *triangularis* the greatest transverse diameter is nearer the basal margin than in this species. It is sometimes found much larger than the specimen here represented, which is selected on account of its perfection. My largest specimen would weigh at least four times as much as this one.

UNIO PERPLEXUS. Plate XVII. fig. 42.

Testá ovatâ, obliquâ, nodulorum seriem irregularem (fere mediis in valvulis) à natibus ad marginem baseos currentem habente; valvulis crassis; clivo umboniali irregulariter rugato; radiis exiguis et numerosis; dentibus cardinalibus modicis. lateralibus longis subrectisque; margaritâ lacteo-albâ.

Shell ovate, oblique, having an irregular nodulous line near the middle from the beaks to the basal margin; valves thick; umbonal slope irregularly wrinkled; rays small and numerous; cardinal teeth rather small; lateral teeth long and nearly straight; nacre milk white.

Hab. Ohio river, T. G. Lea.

My Cabinet.

Cabinet of Professor Vanuxem.

Cabinet of P. H. Nicklin.

Cabinet of the Academy of Natural Sciences.

Cabinet of the American Philosophical Society.

Diam. 1·5, Length 1·9, Breadth 2·6 inches.

Shell ovate, oblique, inequilateral, having an irregular nodulous line near the middle passing obliquely from the beaks to the basal margin; substance of the shell thick; umbonal slope irregularly wrinkled; anterior to the umbonal slope is a wide slightly impressed furrow; beaks prominent, rounded, and situated near the anterior margin; ligament slender and somewhat long; epidermis smooth, shining, yellowish, with numerous small green rays which thickly cover the whole disk except a small portion of the anterior part; cardinal teeth rather small, deeply cleft in the left valve, single and emerging from a pit in the right valve; lateral teeth long, nearly straight, and slightly enlarged near the posterior end; anterior cicatrices distinct; posterior cicatrices confluent; dorsal cicatrices situated on the under part of the cardinal tooth; cavity of the beaks wide and rounded; nacre milk white, rarely rose coloured.

Remarks.—This extraordinary and highly interesting shell formed one of the three divisions into which I had, in my cabinet, separated the *U. cornutus* (Barnes). The other division has been called by Dr Hildreth *foliatus*. Having, since the publication of my last memoir*, received numerous young and perfect specimens, I have concluded that the study of this group would be facilitated by its separation into three species, which will stand thus; *U. cornutus* (Barnes), possessing three or four distinct horns between the beaks and basal margin; *U. foliatus* (Hildreth), having no elevation, but possessed of two elongations, one at the basal margin, the other at posterior margin; and *U. perplexus* (Nob.), possessed of an irregular oblique nodulous ridge

* See note, Vol. III. p. 418.

passing from the beaks to basal margin. The figure represents a perfect and beautiful specimen. It sometimes occurs, however, with an extended posterior portion so large as to be nearly as wide again as the natural width of the shell. The pallial impression, nevertheless, does not advance beyond its natural position, and the space beyond is covered by a prolonged and hard portion of the fringe of the mantle. The irregularity of the nodules is very remarkable and varies from one on each valve to twelve. Where there are few, they are generally much elevated, and there being a correspondent depression in the other valve the specimen presents a remarkable, and distorted appearance. Specimens are occasionally found of a beautiful rose colour. These, however, are very rare.

UNIO ANGUSTATUS. Plate XVII. fig. 43.

Testâ transversâ, sub-compressâ, angusto-ellipticâ; valvulis tenuibus; natibus prominulîs et apicibus undulatis; radiis obsoletis; dentibus cardinalibus elevatis et compressis, lateralibus longis, subrectisque; margaritâ purpureâ et iridescente.

Shell transverse, somewhat compressed, narrow-elliptical, valves thin; beaks slightly elevated and undulated at the tips; very obsolete; cardinal teeth elevated and compressed; lateral teeth long and nearly straight; nacre purple and iridescent.

Hab. { Congaree river, South Carolina.
 { Cooper river, South Carolina, Professor Ravenel.

My Cabinet.

Cabinet of Professor Vanuxem.

Cabinet of Professor Ravenel.

Cabinet of Major Le Conte.

Cabinet of the Academy of Natural Sciences.

Diam. 7, Length 1·1, Breadth 2·8 inches.

Shell very transverse, somewhat compressed, very narrow-elliptical, inequilateral; substance of the shell thin; beaks slightly elevated and

undulated at the tips; ligament long and slender; epidermis reddish brown, rays obsolete; cardinal teeth elevated, compressed and crenulate; lateral teeth long, nearly straight and enlarged at the posterior end; anterior cicatrices distinct; posterior cicatrices confluent; dorsal cicatrices situated in the angle of the cavity of the beaks; cavity of the beaks wide and shallow; nacre dull purple.

Remarks.—This species resembles somewhat the *Unio complanatus* (Soland.). It will, however, at once be distinguished by its great proportionate breadth. In this it resembles the *U. nasutus* (Say), but may be readily separated from that species by its want of the peculiar rays of the *nasutus* and the absence of its posterior enlargement. In the summer of 1827, I found several young and striking specimens of this species in the Congaree at Columbia, S. C. and I am recently indebted to Professor Ravenel for several adult specimens, one of which is represented in the plate. In some specimens the umbonial slope is more elevated and the basal margin straight.

I have a single specimen nearly white in the nacre; and they will, most probably, be found of a salmon colour, as well also of all the tints between these colours, similar to the *U. complanatus* with which and some other it seems to form a natural group*.

* Extract from a letter recently received from Professor Ravenel. "I have been fortunate enough to obtain very good series of the two shells which I was anxious to submit to your examination, as well as a complete series of the *complanatus* in all the varieties in which it occurs in Cooper river and its tributary streams. This will enable you to compare the *lengthened* shell [the above described species] which I thought distinct, with such specimens of the *complanatus* as approach it, and to determine the point. Our shell resembles the *nasutus* closely, particularly the young shell, but is certainly distinct from it. I have never seen the *nasutus* in this state or in North Carolina."

Charleston, South Carolina, May 27th, 1831.

UNIO ARCAEFORMIS. Plate XVII. fig. 44.

Testa arcæformi, valde ventricosâ, transversâ; clivo posteriori latissimo et sulcum curvum habente; valvulis præcrassis; radiis capillaribus; dentibus cardinalibus crassis, lateralibus brevibus rectisque; margaritâ albâ.

Shell arcæform, very ventricose, transverse ; posterior slope very wide and possessed of a curved furrow ; valves very thick; rays hair-like ; cardinal teeth thick ; lateral teeth short and straight ; nacre white.

Hab. Tennessee river, Professor Vanuxem.

My Cabinet.

Cabinet of Professor Vanuxem.

Cabinet of W. Cooper.

Diam. 2,	Length 2,	Breadth 2·5 inches.
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Shell subtriangular, very ventricose, transverse, inequilateral ; posterior slope very wide, and nearly flat except at the termination of the ligament, possessed of a curved furrow enlarging from the beaks to the posterior margin ; substance of the shell very thick ; beaks prominent and incurved ; ligament short and thick ; epidermis yellowish brown ; rays hair-like and numerous ; cardinal teeth thick and irregular ; lateral teeth short, straight and crenate ; posterior cicatrices confluent ; anterior cicatrices distinct ; dorsal cicatrices situated on the under part of the cardinal tooth ; cavity of the beaks shallow and rounded ; nacre white.

Remarks.—I have been in possession of a single specimen of this species for some years. It was brought by Professor Vanuxem from the Tennessee river, and, being old, some of its characters have nearly disappeared. I frequently examined it with great interest, and felt persuaded it was a new species, although it strongly resembled the *triangularis* (Barnes). A young and an adult specimen, recently sent me from New York by that excellent naturalist W. Cooper, proves it beyond a doubt to be a distinct species. In its rays it differs altogether from the *triangularis*; it is dissimilar also in the thickness of the valves and

in the possession of two remarkable curved furrows on the umbonal slope. The specimen represented in the engraving is chosen on account of its being adult, although the beaks are not in a perfect state of preservation. The enlargement and dentate appearance of the posterior margin is very remarkable in this and some other of the species. It occurs more frequently in the *sulcatus* (Nobis), and has been particularly noticed in the remarks on that species*. This variety of *sulcatus* has been considered by Mr Say as a distinct species, to which he has given the name of *ridibundus*. I have never thought that it could be considered to differ specifically from the *sulcatus*.

UNIO SUBROTUNDUS. Plate XVIII. fig. 45.

Testá suborbiculatá, subventricosá; valvulis crassis; natibus prominentibus; epidermide circa nates luteá, juxta marginem fuscá; radiis interruptis; dentibus cardinalibus crassis, lateralibus subcurvis brevibusque; margaritá albá et iridescente.

Shell suborbicular, subventricose ; valves thick ; beaks elevated ; epidermis yellow about the beaks, brown towards the margin ; rays interrupted ; cardinal teeth thick ; lateral teeth short and slightly curved ; nacre pearly white and iridescent.

Hab. Ohio, T. G. Lea.

My Cabinet.

Diam. 1·1,	Length 1·6,	Breadth 1·6 inches.
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Shell suborbicular, nearly equilateral, subventricose ; substance of the shell thick, somewhat thinner behind ; beaks thick and elevated ; ligament rather short and thick ; epidermis yellow and smooth in the region of the beaks ; brown and finely wrinkled towards the margin ; interrupted rays pass from the beaks and are very visible over the umboes, but are lost in the wrinkles before they reach the margin ; cardinal teeth thick and crenate ; lateral teeth short, thick and very slightly curved ; posterior and anterior cicatrices both distinct ; dorsal

* See Vol. III. p. 431.

cicatrices situated on the under side of the cardinal teeth; cavity of the beaks deep and angulated: nacre pearly white and iridescent.

Remarks.—Among the numerous shells I have received within the last five years from our western waters, I have obtained but three or four of this interesting species. Its extreme rarity at first induced me to doubt of the propriety of considering it a distinct species. It is however, perfectly distinct from any described species and seems peculiar in its yellow beaks and brown margin; as well as in the beautiful interrupted rays which pass over the umbones, leaving the anterior and posterior slopes usually of a yellow colour. In form it approaches the *ebenus* (Nobis), in colour it more nearly resembles the *undatus* (Barnes). A young individual of not more than three growths presents such a shining and yellow epidermis as to resemble very much a small *Venus*.

UNIO SUBOVATUS. Plate XVIII. fig. 46.

Testá subovatá, transversá, inflatá; valvulis crassis; natibus prominentibus et apicibus undulatis; multis radiis viridibus; dentibus cardinalibus erectis et in valvula utraque duplicibus, lateralibus laminatis brevibusque; margaritá albá.

Shell subovate, transverse, inflated; valves thick; beaks elevated and undulated at the tip; rays green and numerous; cardinal teeth double in both valves and erect; lateral teeth short and lamelliform; nacre white and very pearly.

Hab. Ohio river, T. G. Lea.

My Cabinet.

Cabinet of John Ronaldson.

Cabinet of the Academy of Natural Sciences.

Diam. 2·2,	Length 3,	Breadth 4·2 inches.
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Shell subovate, transverse, inequilateral, inflated; substance of the shell thick; beaks elevated, incurved and undulated at the tips; ligament short and thick; epidermis yellowish with numerous green rays

passing obliquely from the beaks to the margin; cardinal teeth large, double in both valves, very erect and deeply cleft in both valves; lateral teeth short and lamelliform; anterior cicatrices distinct; posterior cicatrices confluent; dorsal cicatrices situated within the cavity of the shell on the under part of the cardinal tooth and on the plate between the cardinal and lateral teeth; cavity of the beaks very large and rounded; nacre white and very pearly.

Remarks.—This species is very closely allied to the *U. ovatus* (Say) and *U. occidens* (Nobis). It differs constantly, however, from both, in being more produced posteriorly, and in the position of the beaks which are placed nearer the anterior margin. It is less flattened on the posterior slope than the *ovatus*, and less carinate than the *occidens*. Like both these species the anterior section of the cardinal teeth is the most elevated. In some specimens no rays are observable*.

UNIO PILEUS. Plate XVIII. fig. 47.

Testa subtriangulari, ventricosa, praeclico umboniali in longum subsulcata, emarginata; valvulis crassis; radiis capillaribus; dentibus cardinalibus magnis, lateralibus breviusculis subcurvisque; margarita albâ et iridescente.

Shell subtriangular, ventricose, slightly emarginate, longitudinally furrowed in

* Since this supplement went to press I have seen in the fine collection of that excellent conchologist, Mr W. Hyde, a specimen sent him by Mr Barnes some years since as *U. ventricosus*. If this specimen be not of the same species as the above described, it certainly very closely resembles it. Never having seen the individual specimen described by Mr Barnes as *ventricosus*, I believed, from that part of the description in which he says "this shell is more capacious than any other of the genus hitherto described," that he meant the species known to us as *globosus*, and therefore I selected of the two species that which seemed to agree the least with his description, and figured and described it. Should it, upon further examination, prove that I have described the same shell with Mr Barnes, the name of *globosus* should be used to distinguish this capacious species, specimens of which are in the cabinets of Mr Hyde, the Academy of Natural Sciences, Peale's Museum, and in my own. Mr Barnes must, I think, be in error in supposing the *ventricosus* to inhabit the Delaware, or New Jersey near New York. I do not think that any of the group belong to our eastern waters.

front of the umbonal slope; valves thick; rays hair-like; cardinal teeth large; lateral teeth rather short and slightly curved; nacre pearly white and iridescent.

Hab. Ohio river, near Cincinnati, Mrs Febiger.

My Cabinet.

Diam. 1·2, Length 1·8, Breadth 1·8 inches.

Shell subtriangular, angular behind and rounded before, ventricose; longitudinally furrowed in front of the umbonal slope, the furrow causing a slight emargination in the basal margin; umbonal slope flattened on the ridge; substance of the shell thick; beaks prominent and rounded at the tip; ligament short and thick; epidermis yellowish-brown and wrinkled; rays numerous and hair-like; cardinal tooth large, elevated and deeply cleft in the left valve, single and emerging from a pit in the right valve; lateral teeth short and slightly curved; anterior cicatrices distinct; posterior cicatrices confluent; dorsal cicatrices situated on the under part of the cardinal tooth; cavity of the beaks wide and rounded; nacre pearly white and iridescent.

Remarks.—This shell has recently come into my possession and was taken near Cincinnati. It is different from any species I have seen, and somewhat resembles the *U. sulcatus* (Nobis), having a furrow from the beaks to the margin anterior to the umbonal slope. It differs from it, however, in being more elongated and in being destitute of a purple nacre. The disposition to flatness in the umbonal slope is remarkable in this species.

MELANIA ELONGATA. Plate XV. fig. 29.

Testa elevata et acute turrita, fusco-cornea, purpureo-fasciatâ; anfractibus circiter decem parum depresso; basi angulata; apertura cœruleo-alba, longitudinis testæ quadrantem habente.

Shell elevated and acutely turrited, dark horn colour with purple bands; apex acute; whorls about ten and slightly depressed; base angulated; aperture bluish-white and about one fourth the length of the shell.

Hab. West Tennessee, John Lea.

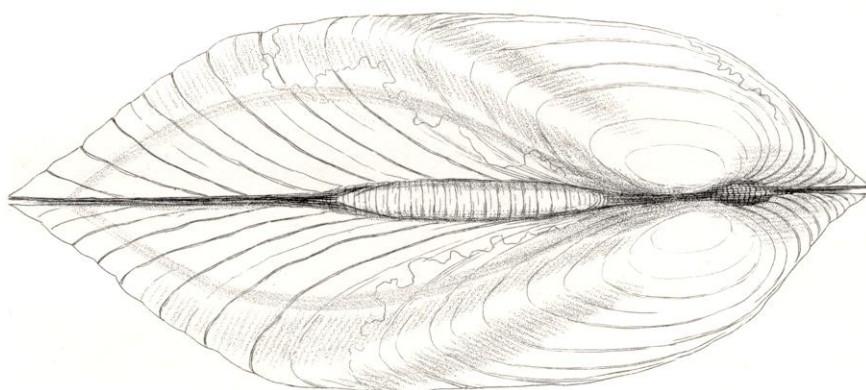
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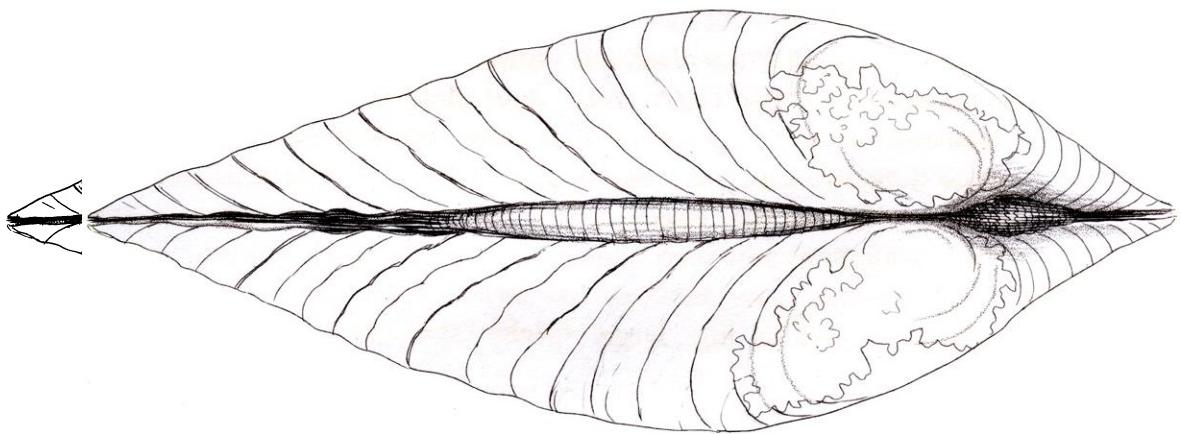
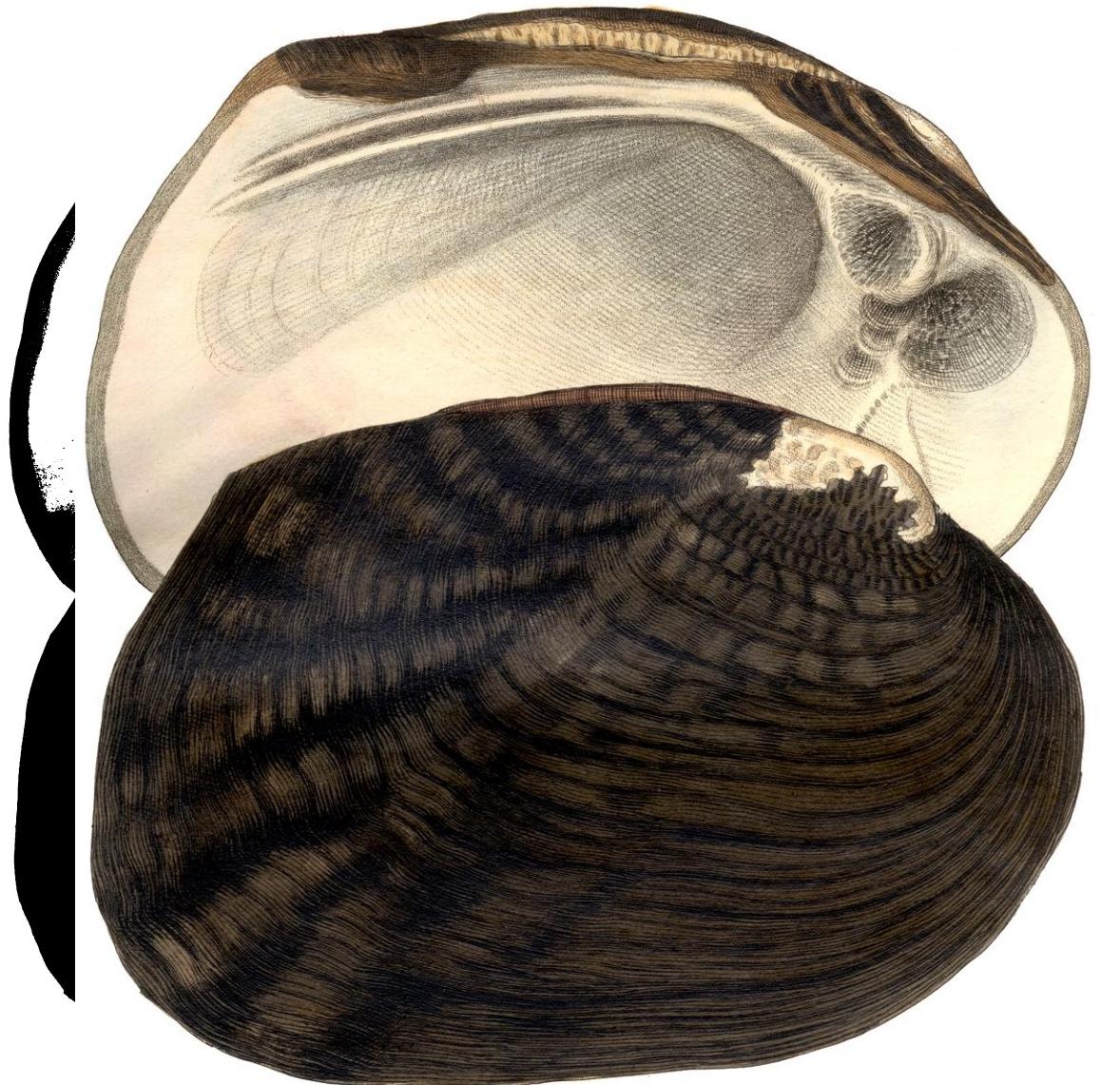
Length 1·5 inches.

Remarks.—This fine Melania seems most to resemble the *subularis* (Nobis). It differs from it in being wider, in being darker coloured, and in having a less number of whirls. The bands in some specimens are scarcely visible.

I cannot terminate this memoir without making my grateful acknowledgements to numerous friends for specimens sent from time to time for my examination or acceptance. To P. H. Nicklin, Esq. and to W. Cooper, Esq. I am under particular obligations, for their kind and prompt assistance on such difficult points as appeared to me to require consultation.

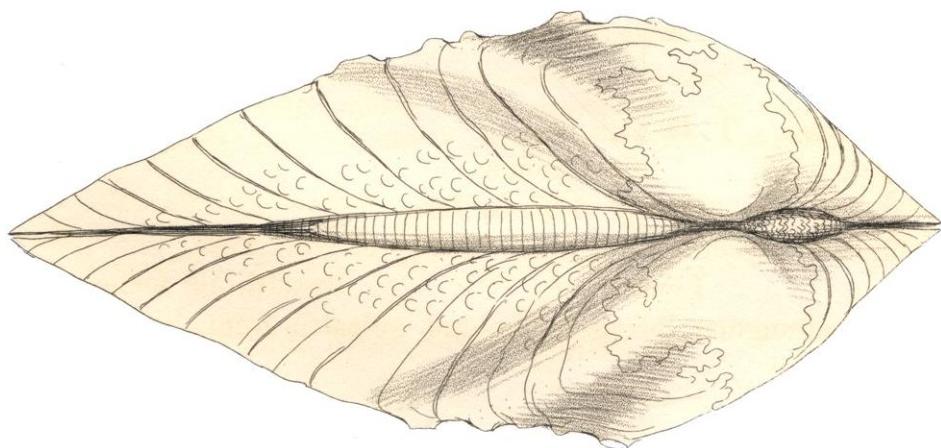


Unio trapezoides



Unio multiplicatus

Drawn & Eng'd by J. Drayton



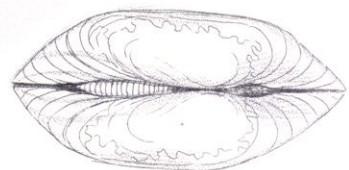
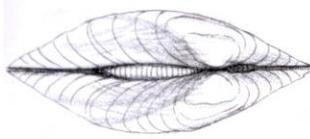
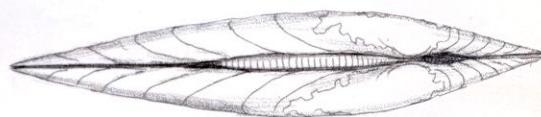
Unio asperimus.

Drawn & Eng'd by J. Drayton.

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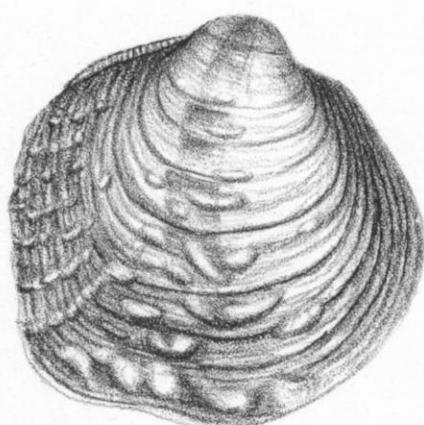
Unio oriens.

Unio congrexus.

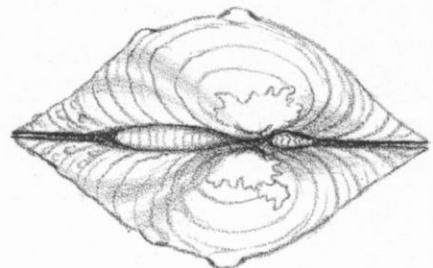
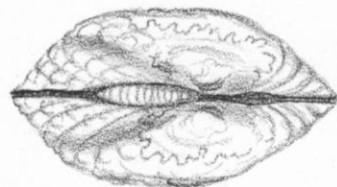
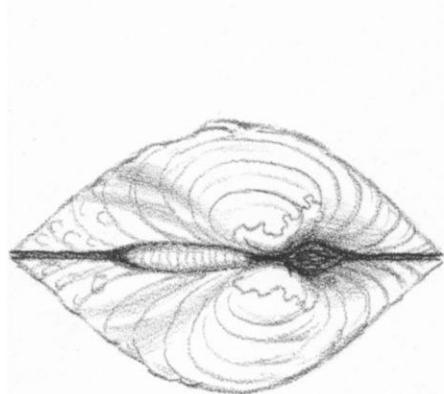
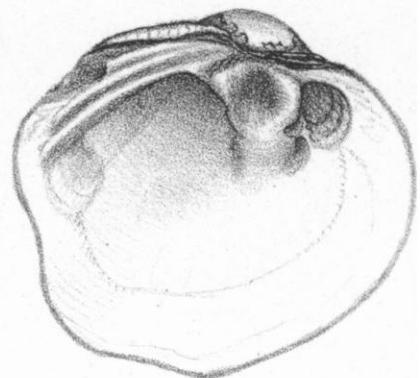
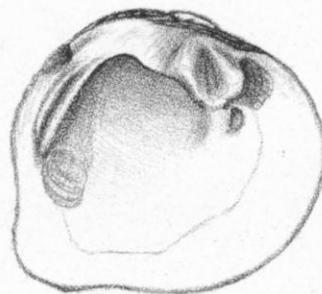
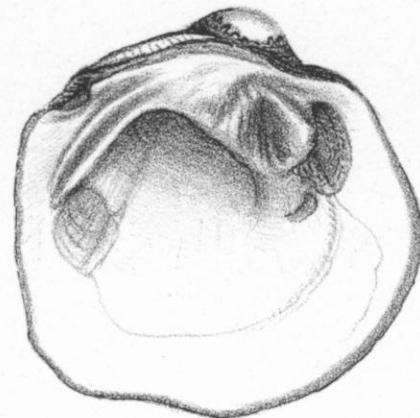
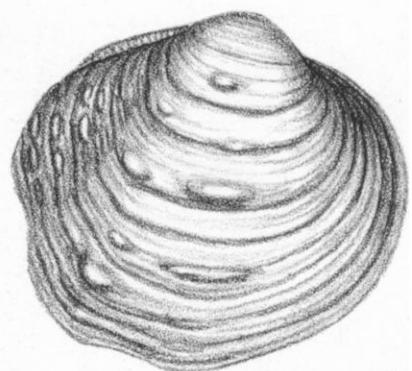
Unio brevidens.

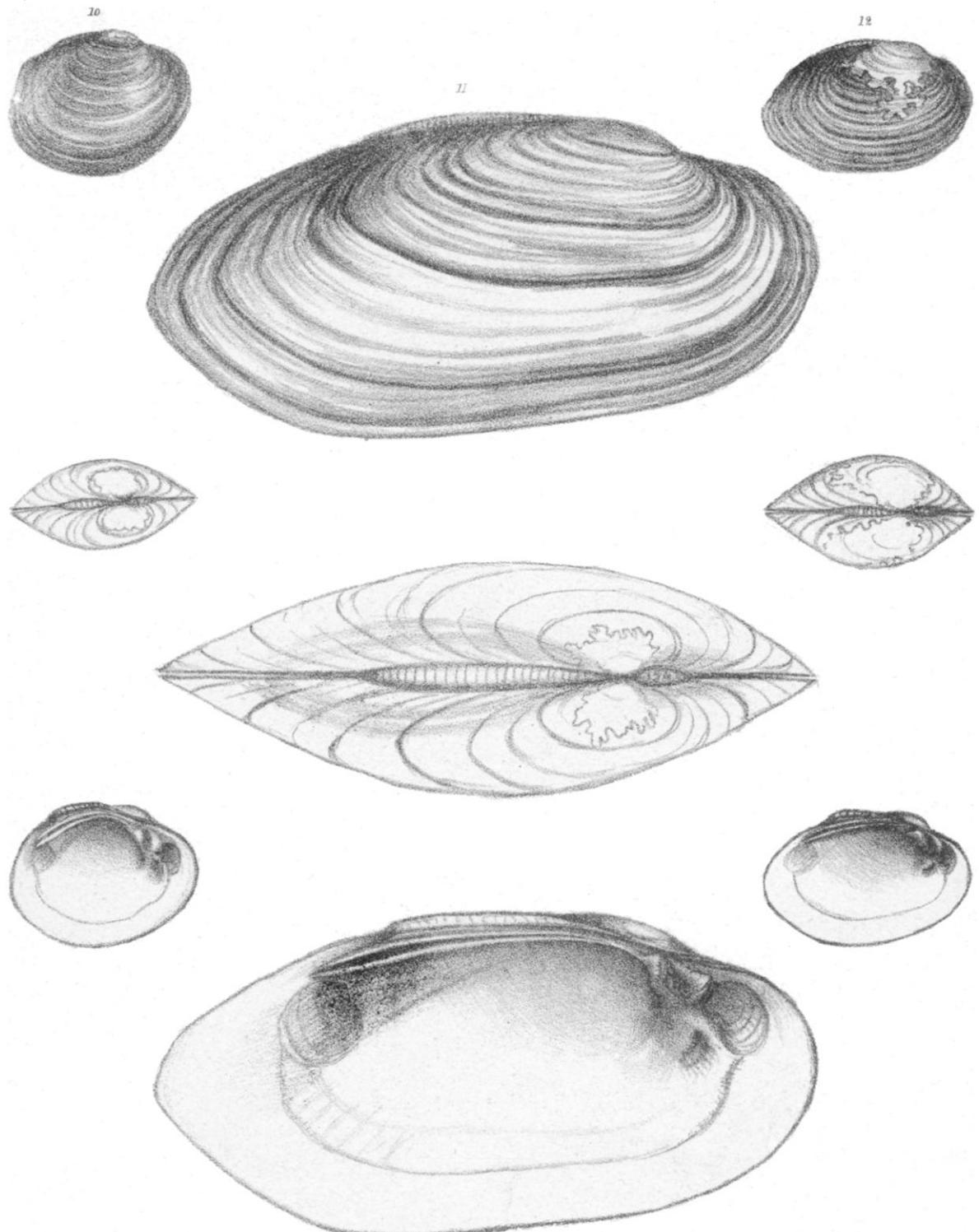
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*Unio stapes.**Unio pustulosus.**Unio pustulatus.*

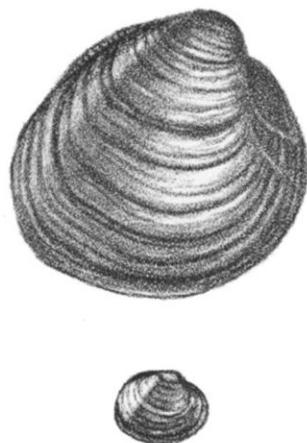


Unio lens.

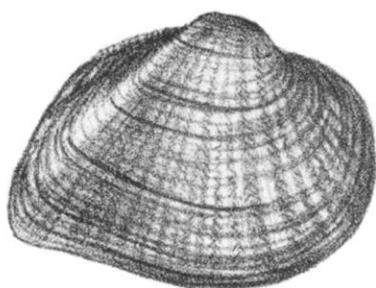
Unio glans.

Unio anadontooides.

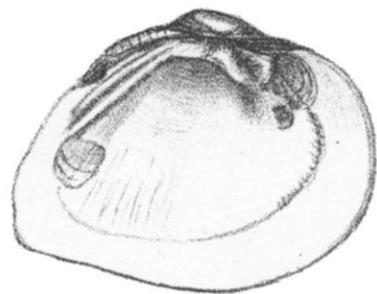
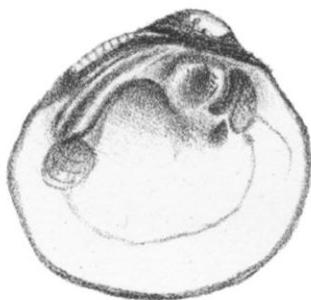
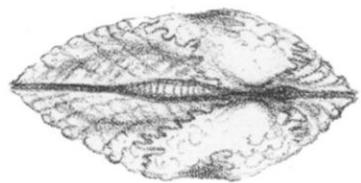
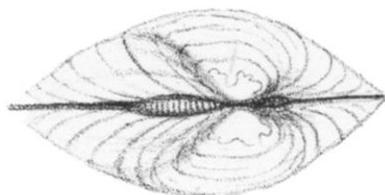
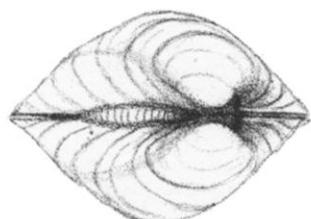
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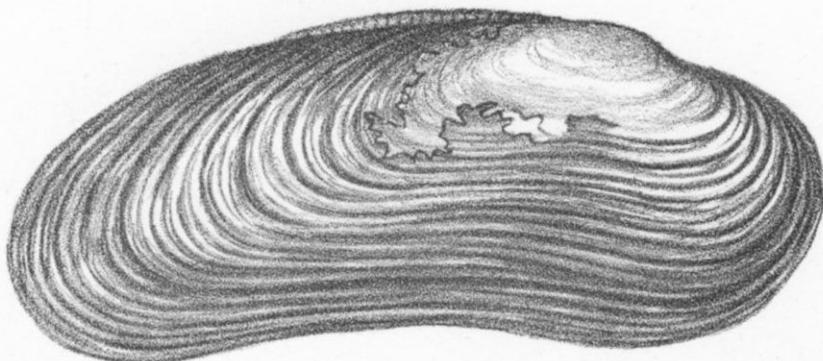


Unio ebenus.

Unio elegans

Unio asper.

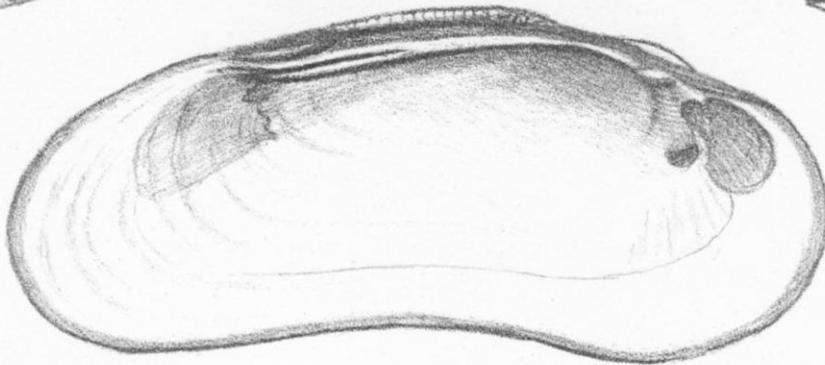
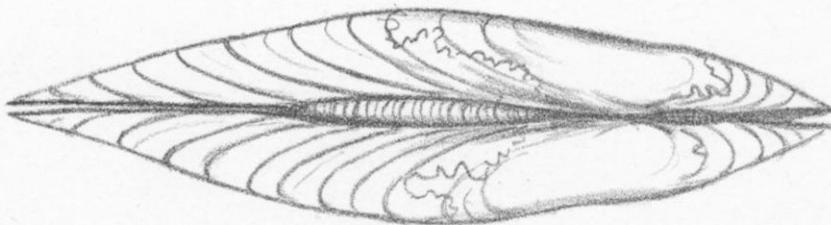
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Unio soleniformis.

Unio fabalis

Unio acutissimus.



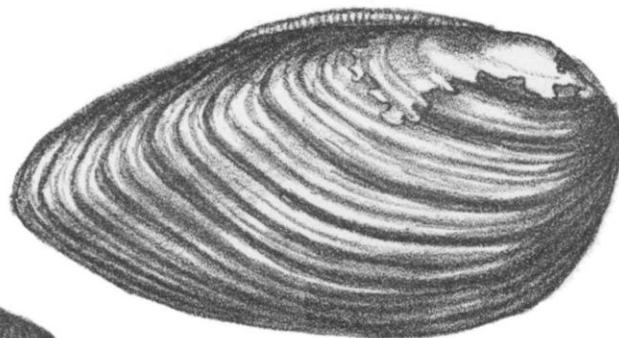
Unio variegatus

Symphegma bilineata.

Drawn by I. Drayton

Unio crenatus

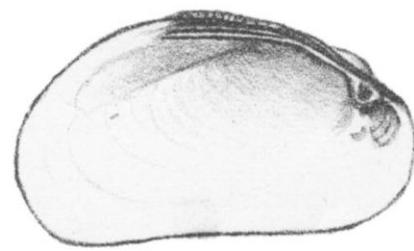
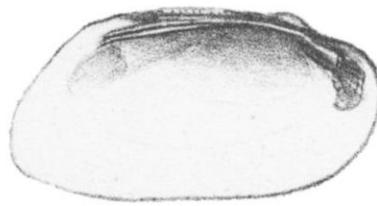
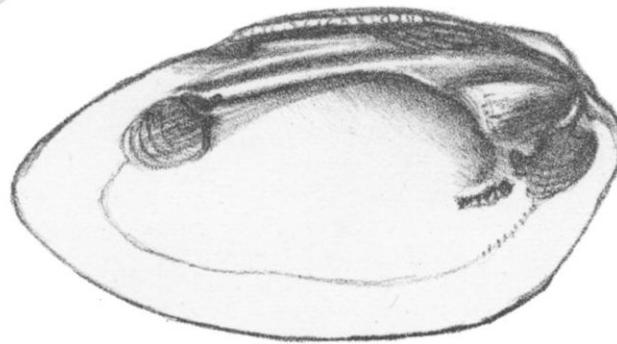
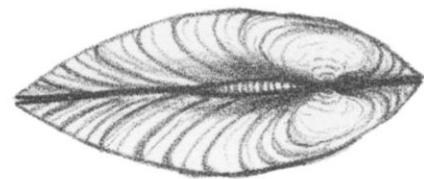
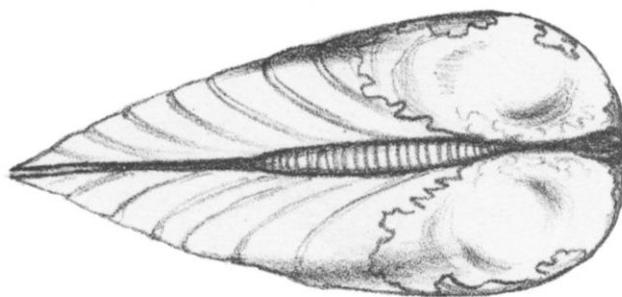
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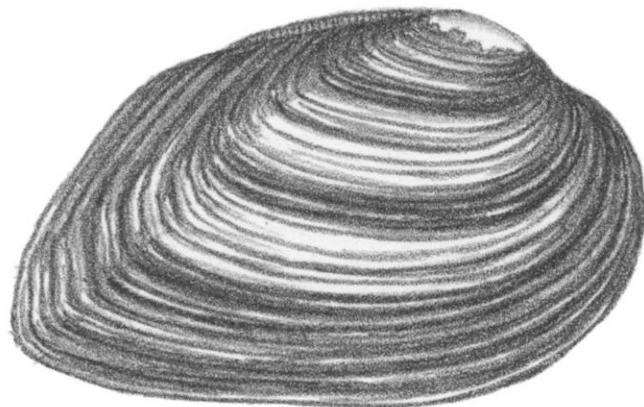


Unio decisus.

Unio multistriatus.

Unio cyprinus

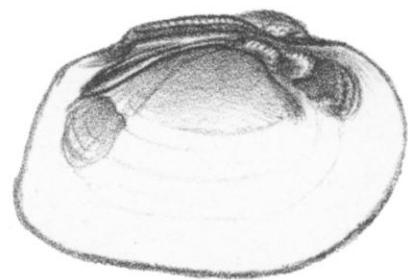
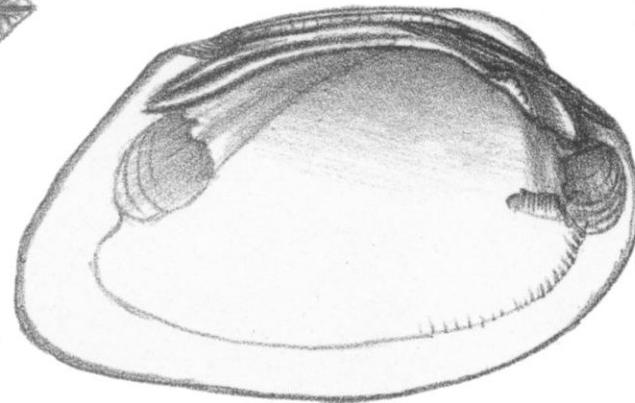
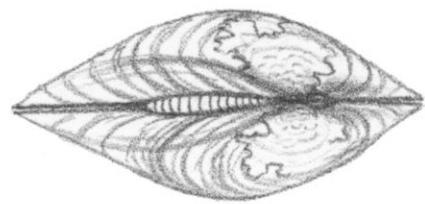
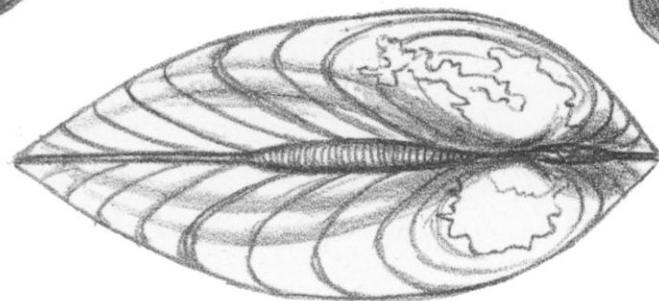
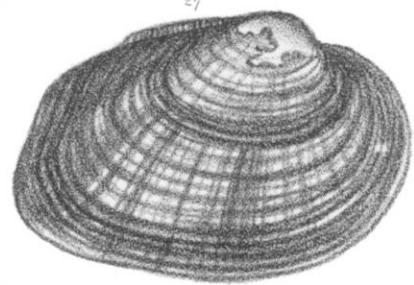
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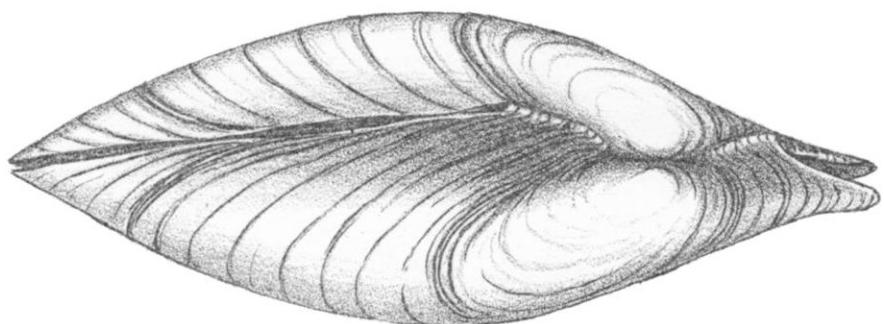


Unio obesus.

Unio variolosus.

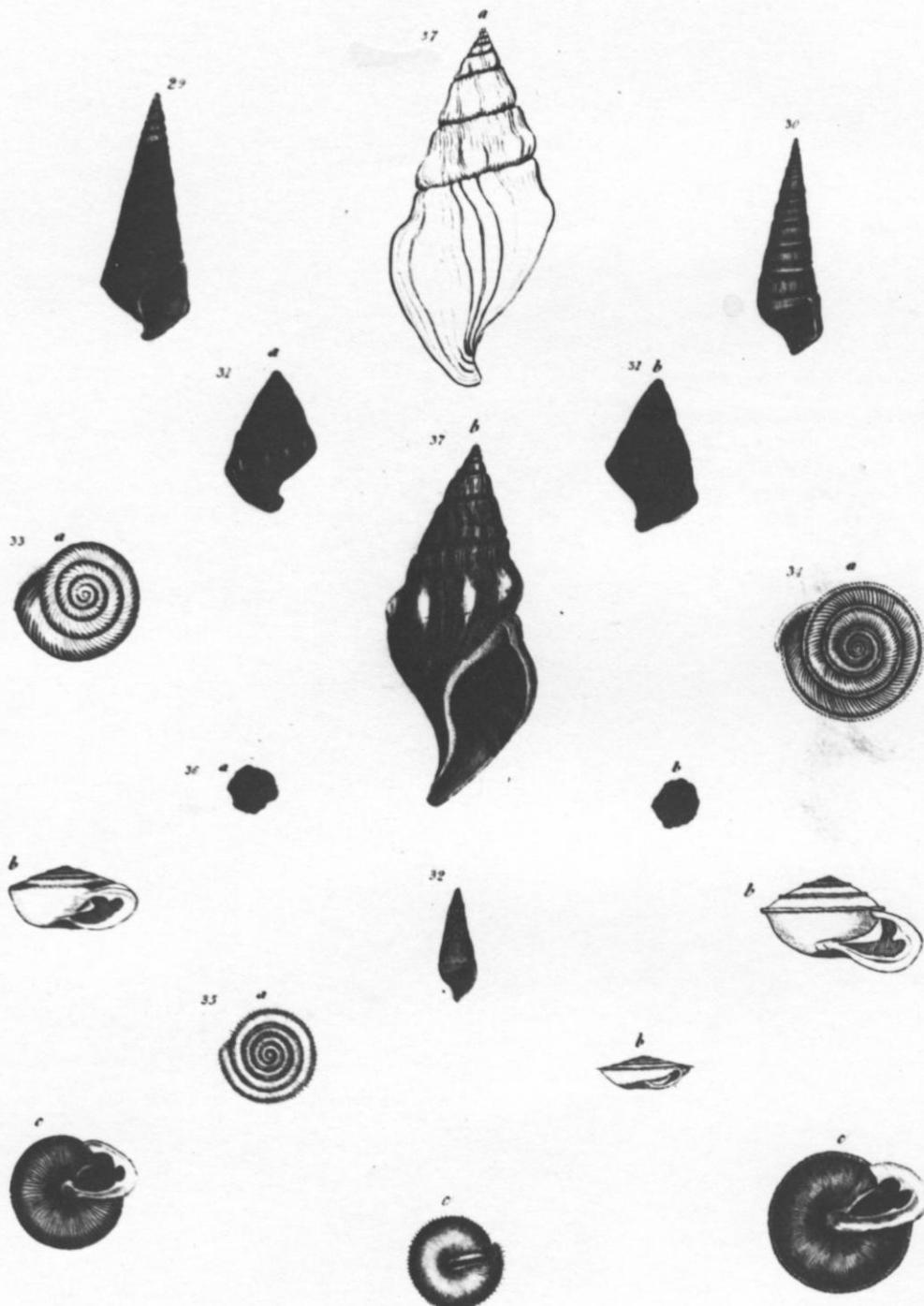
Drawn by J. Drayton.

Unio incurvus.



Sympdynota inflata.

Drawn by J.Drayton.



(Drawn & Eng'd by J. Douglas)

29. *Melania elongata*.

32. *Melanoides acuta*

35. *Caracolla spinosa*.

30. *M. subularis*

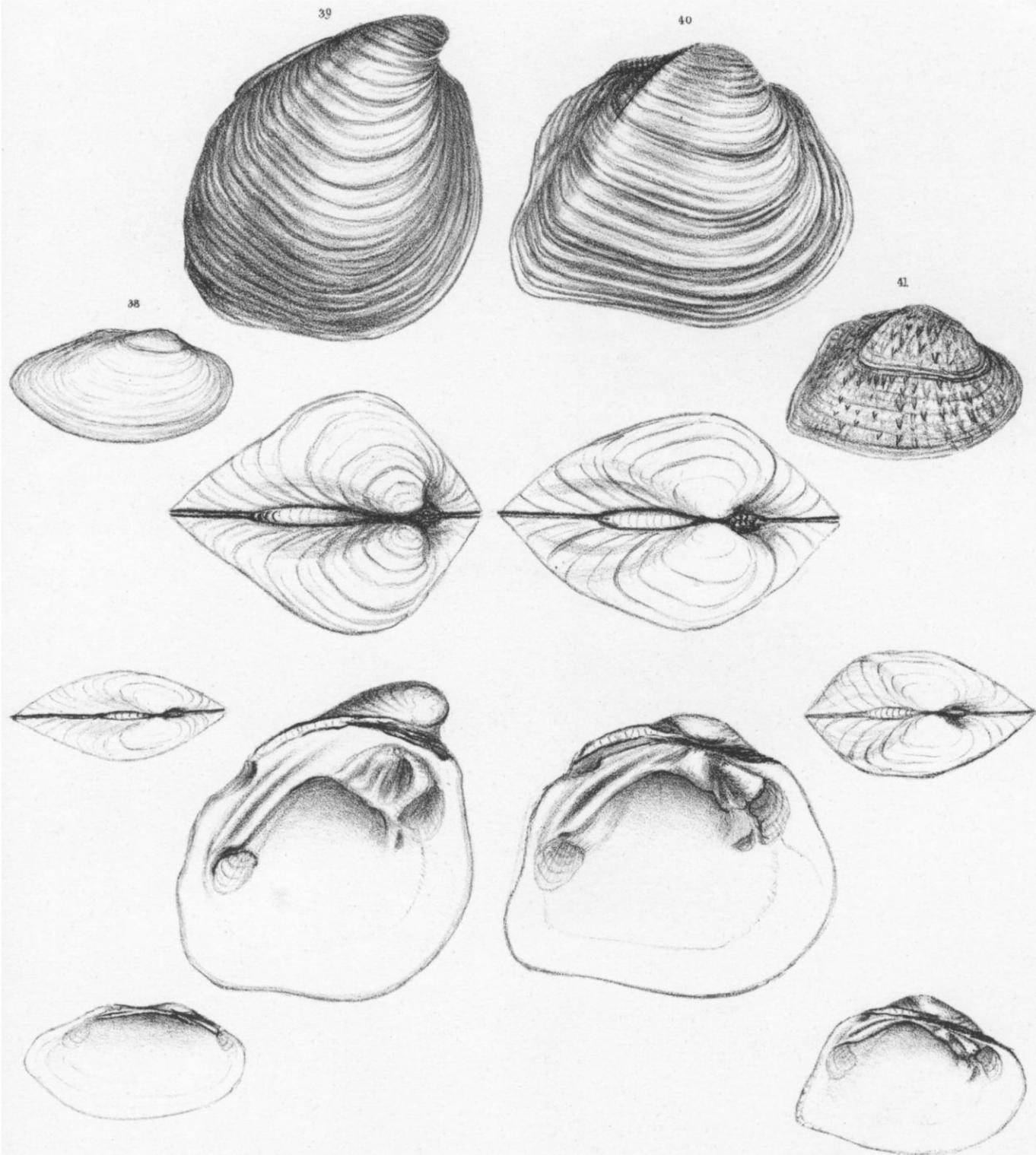
33. *Helix carolinensis*

36. *Valvata armifera*.

31. *M. tuberculata*

34. *Caracolla helicoides*.

37. *Iotus fusiformis*.



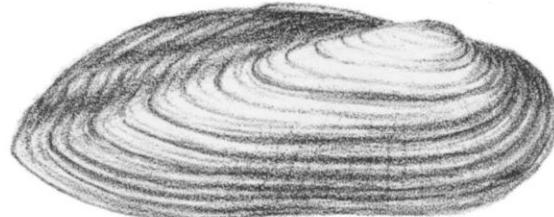
Unio pyramidatus

Unio olivarius

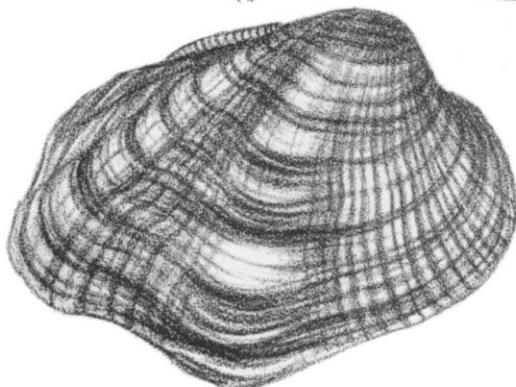
Unio trigonus.

Unio formosus.

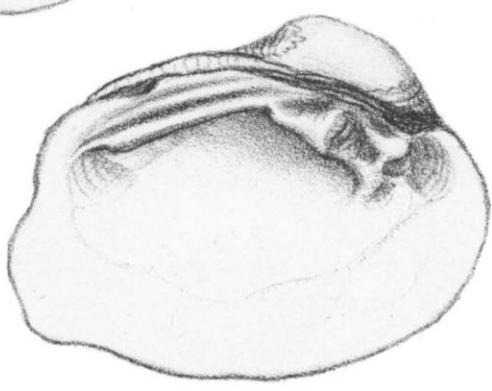
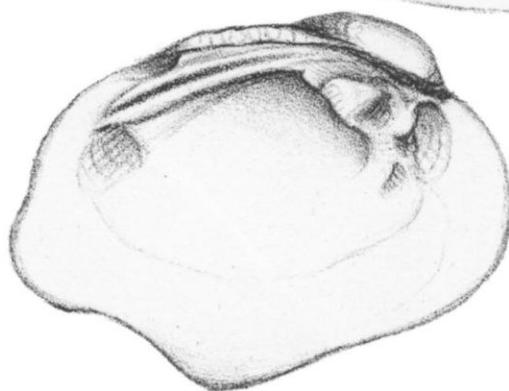
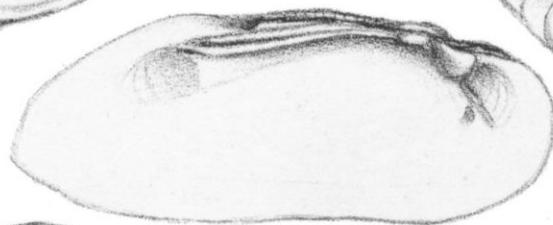
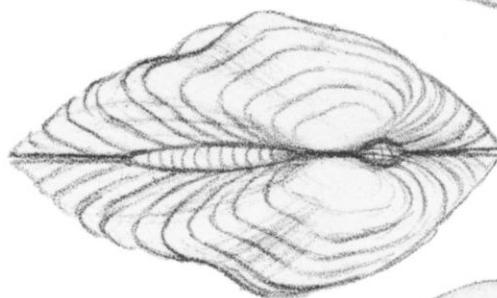
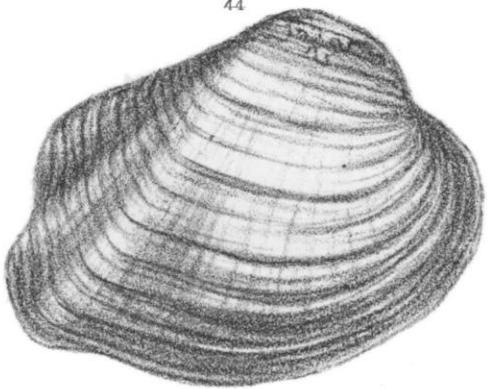
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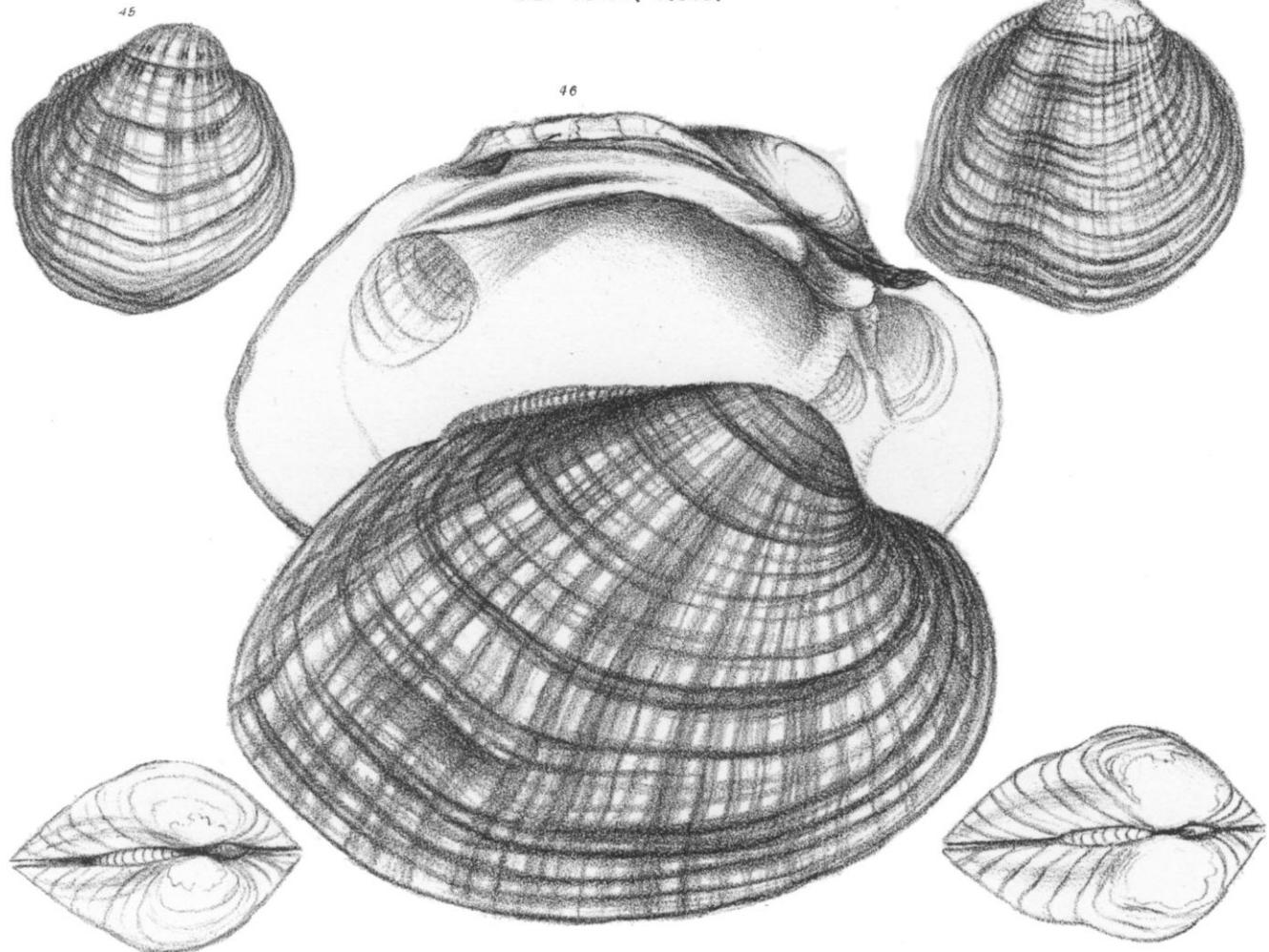


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*Unio perplexus,**Unio angustatus**Unio arciformis*

*Unio subovatus.**Unio subrotundus.**Unio pileus.*